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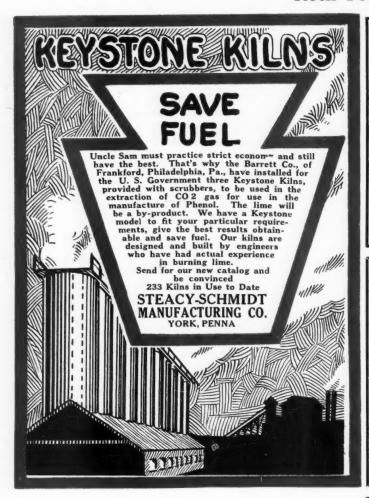
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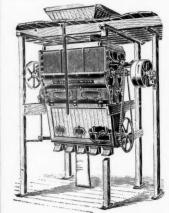
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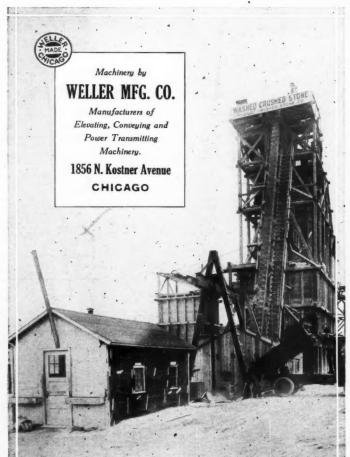
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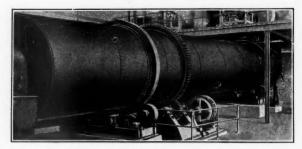
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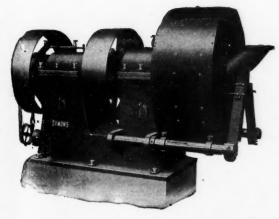
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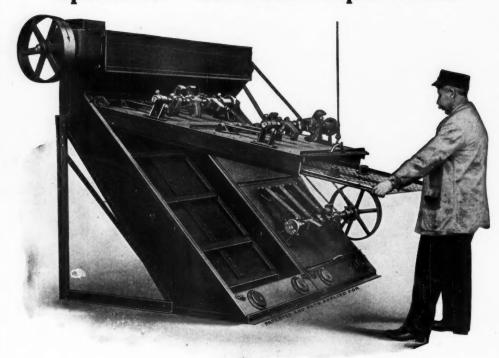


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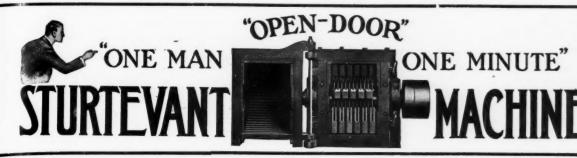
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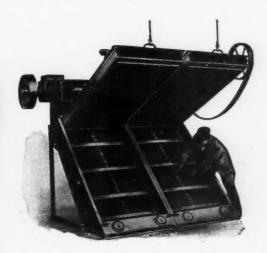
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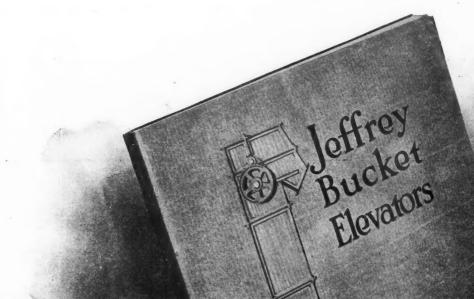
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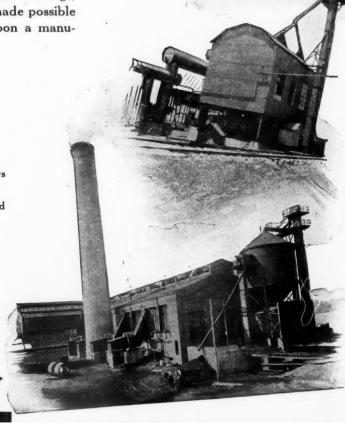
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Vol. XXII

Chicago, January 29, 1919

The Railway Rate Muddle

Early Decision on This Season's Rates Very Essential to Stabilization of Construction Industry

future of the rock product industries today than an early and just settlement of the freight-rate problem. Elsewhere in this issue of ROCK PRODUCTS is given at some length former Director-General of Railroads McAdoo's own utterances on the proposed freight-rate revisions, and a description of the machinery by which they are being made. Ever since last fall rumors of

these freight-rate revisions, particularly as they affect the gross materials of construction—sand, gravel, crushed stone, slag-have been cur-

It has been said that rates were to be established on a zone or mileage basis and were to be based on a percentage of the sixth class rates -recent rumor had it 60 per cent. Such a basis of rates would destroy many existing differentials, on the basis of which large numbers of plants have been built at the expense of millions of dollars. And anything like 60 per cent of the sixth class rate in Central West territory would practically prohibit the movement of these materials in their present market channels.

The two big problems before producers of these raw building materials is to decide whether or not it is better in the long run to establish

all rates on a mileage or zone basis; and to establish a schedule of rates which they can lay before railway men and say: These rates and no more can the indus-

On the first of these issues the traffic committee of the National Sand and Gravel Producers' Association, after very thorough study of the problem in all its phases, recommends a uniform mileage basis of rates. The committee recognizes that this will work much injustice in specific instances of long existing differentials, but believes that the best interests of the entire industry are paramount and that the mileage basis is

O ONE THING is of greater importance to the after all the only just one, and the one which must prevail in the end. Rock Products agrees absolutely with this decision. Differentials are in the nature of favoritism, and it is better in the end to give all shippers the same deal.

> It is, however, an open question whether such a mileage basis should be uniform for large areas of the country where conditions are very different. There

> > certainly should be some leeway in favor of territories which need the business and in favor of some markets which must depend on long hauls for their supplies. And such a mileage basis should take into account all the factors which make these materials the very cheapest to move that any railway handles.

> > On the second of the two big issues the producers of sand, gravel, crushed stone and slag have not individually nor collectively reached any agreement. Yet they cannot present their case properly to the railway authorities until they do so. They must be able to prove to railway men that they know more about their own industries than the railway men do. They must know absolutely the maximum rates the industry can stand and see to it that these maximum rates are not exceeded in the proposed revisions.

For politic reasons railway men do not want to destroy the industries as they now exist, nor for their own interest do they want to put into effect rates which will destroy a considerable source of their revenue. They are fishing around in the dark to hit upon the very thing that the producers themselves can tell them—the maximum rates these commodities can stand.

As this issue of Rock Products goes to press word is received that the proposed rate schedule for the Central West territory will be submitted to a special meeting of sand and gravel men, and allied industries, in Chicago on January 30.

Next Month's Conventions

NATIONAL CRUSHED STONE ASSOCIATION

Buffalo, Feb. 11 and 12

THE LIME ASSOCIATION Pittsburgh, Feb. 12 and 13

Don't miss them!

Arrangements have been made by the officers of the National Association of Sand and Gravel Producers with the Central District Freight Traffic Committee to present the proposed schedule of freight rates at a special meeting in Chicago January 30. See next issue of ROCK PRODUCTS for a report of this meeting.

Freight Rate Question Most Important Issue Before Mineral Aggregate Producers

Discussion of and Action on This Issue Alone Should Bring Every Producer to National Association Meetings

AS THIS ISSUE OF ROCK PROD-UCTS goes to press the National Association of Sand and Gravel Producers is meeting in Chicago, and one of the biggest problems to be thrashed out there is "What action shall we take in the freight-rate tangle?" Two weeks from today the quarry men of the United States meet in Buffalo, N. Y., to go over the same problem.

No producer of mineral aggregate can afford to miss these discussions. At this writing apparently no one knows whether freight rates on sand, gravel, slag, crushed stone and agricultural limestone will go up or down as a result of proposed freight tariff revisions. But it is pretty well settled that revisions are about to be proposed that will change the whole rate structure on these commodities, and this change will have a very vital influence on the future of these industries if carried into effect.

Orders Come From Washington

The proposed rate changes are being made on orders direct from the Federal Railroad Administration to the three general freight traffic committees which have jurisdiction over most of the territory east of the Mississippi River. Upon the action taken by these committees will possibly be established a rate structure for the country as a whole.

In describing the work of these traffic committees Mr. McAdoo, recently Director General of Railroads, said in his annual report (issued January 13, 1919):

Organization of Freight Traffic Committees

"In order to bring about greater efficiency as well as expedition in the method of handling changes of rates, rules, and regulations affecting the transportation of shipments by freight, three general freight traffic committees have been appointed with headquarters at New York City, Atlanta, and Chicago, having jurisdiction, respectively, over the territories embraced within the official, southern, and western classifications.

"Serving under these general committees are district freight traffic committees, to which either the carriers or shippers may propose changes and by which recommendations are made to the proper general committee. These committees are conveniently located at Boston, New York, Philadelphia, Buffalo, Pittsburgh, Detroit, Cincinnati, Chicago-Eastern, St. Louis-Eastern, Richmond, Louisville, Atlanta, Birmingham, Jacksonville, New Orleans-Southern, Chicago-Western, St. Louis-Western, New Orleans-Western, St. Paul, Kansas City, Dallas, Denver, Portland, and San Francisco. Situated as they are at the larger trade centers in the various sec-

Railroad Administration Not Considering Increase In Present Basis of Rates?

Walker D. Hines, Director General of Railroads, authorizes the following:

There is no foundation for the report that the Railroad Administration has given or is giving any consideration to any increase in present basis of rates.

The results of operations for the year will be largely dependent upon the volume of traffic. If the volume of traffic should be as large as last year, it is believed the operating income would be sufficient to pay the rental. As soon as any reasonably satisfactory conclusion as to the probable volume of traffic can be formed the public and Congress will be given the best possible estimate of the prospects for 1919.

tions of the country, they permit of easy access either by mail or in person of any individual, corporation, or carrier desirous of placing a subject before them.

"That the interests of the shipping public might be properly protected and served, the Division of Traffic co-operating with that of Public Service and Accounting, has instituted the innovation of having upon each of these various committees one or two members who have been selected with the approval of the Director of Public Service by the general business interest of the section over which their particular committee

has jurisdiction. These shippers' members engage actively in the deliberations of their respective committees and have voice and authority equal to that of the individual railroad members in the reports and recommendations made. Among those who are familiar with the work done, the results accomplished are regarded as very satisfactory."

Plan for Changing Rates

Mr. McAdoo makes the following announcement as to his plans for "the consolidation and simplification of tarriffs," upon which the various freight traffic committees are now working. Mr. McAdoo in his annual report says:

"A plan is well under way for the simplification and consolidation of freight tariffs which it is believed will not only save approximately \$2,000,000 per annum in the tariff printing bill of the railroads but put the tariffs in a great deal better shape for use by the shipping public and railroad employees.

"Under past practices there have been some so-called bureau tariffs containing the rates of all roads in a certain section, but to a large extent each railroad has continued to publish separately the rates between points on its lines or with its connections. This means that where two or more lines serve the same points the publication of the rates is duplicated sometimes as many as 20 times. This has not only been very expensive, but has also frequently resulted in rates or regulations applying via one carrier different from those via another between the same points and in changes in rates being made effective on different dates via different routes.

"These separate tariffs contain many rules, practices, etc., which vary slightly on different roads or in different sections without good reason, all of which has made the freight tariffs very confusing and difficult of proper application.

"New tariff publishing bureaus have already been established at several important points, and freight tariff revision committees have been appointed in eastern, southern, and western territories to carry on the work of consolidating and simplifying the tariffs."

In his statement before the Interstate Commerce Committee of the United 29, 1919

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States Senate, January 3, Mr. McAdoo

"In the matter of rates, an immense advantage resulting from unified control is that rates can be made only so high as may be necessary to protect the situation as a whole, through paying the total expenses and producing only a sufficient resulting operating income to represent a fair compensation for the property employed. But under separate management, there is the greatest diversity in the prosperity of the railroad companies. Some will prosper on very low rates and some will fail on very high rates. The result is either that rates must be maintained on an average basis which, while producing high profits for some railroads, will still leave other railroads in bankruptcy, or must be made sufficiently high to leave a margin of profit to the less prosperous, with consequently excessive profits to the most prosperous. The former course will result in the less prosperous roads being unable to perform their public service successfully. The latter course will result in the public being burdened with unnecessarily high rates. Under unified control rates which are sufficiently high on an average, to protect the general situation, will insure an adequate service on all roads and will, at the same time, protect the public against rates being made any higher than is necessary to meet the real necessities of the situation. I do not believe there can be any successful solution of the railroad problem which leaves in existence the great disparity in the results of the same rates to different railroad companies because this will always cause question as to the propriety of any scale of rates and will keep the rate question in constant tur-

Most Important Factor in Transporta-

Under the heading "Lessons Learned" in his report on the railways to the President, Mr. McAdoo states:

"The controlling factor throughout our experience has not been in the road transportation, but at the ultimate destination, and any serious conditions of congestion obtaining on any of the trunk lines en route has been the reflex of the conditions at the terminals themselves."

Further on in the same report the Director General recommends as the first requisite in economizing methods of transportation—Unification of terminals. Again in his statement before the Interstate Commerce Committee of the

"One of the most difficult and important railroad problems in this coun-

Rock Products

try is the problem of terminal facilities. It probably means more to the producing and consuming public in the matter of delays, inconvenience, and transportation burdens than any other phase of transportation. It is generally understood that the delays and excessive costs do not occur principally on account of insufficiency of facilities on the road, but on account of inadequate terminals and of the heavy terminal costs."

Then he goes on to show how immense sums must be spent for adequate terminals; in the single example quoted, Cincinnati, the sum required is \$45,000,-Similar sums are required else-

where. The ultimate cost of all these improvements must of course be paid for by the traffic.

Why Should Mineral Aggregates Be Charged For High Terminal Costs?

In much of the road work for which they are used crushed stone, slag, sand and gravel ordinarily move from a plant at a considerable distance from terminals to switches and side tracks on the same line of railway and do not move through terminals at all. Why should these commodities be expected to carry freight rates designed to reimburse the railways for such terminal costs?

Report of the Sand and Gravel Committee on Freight Rates

Uniform Per Ton Per Mile Basis of Rates Is Recommended for Adoption by National Association of Sand and Gravel Producers

To the National Association of Sand and Gravel Producers:

The undersigned committee, created by the Executive Committee of the National Association of Sand and Gravel Producers at a meeting held at Chicago on December 11 and 12, 1918, beg to report that in pursuance to the authority thereby conferred, met at Indianapolis on December 23, with H. D. Conkey, President of the Illinois Sand and Gravel Producers' Association; Geo. V. Miller of Indianapolis, President of the Indiana Sand & Gravel Producers' Association; Guy C. Baker, Executive Secretary of the Ohio Sand and Gravel Producers' Association and member of the Executive Committe of the Michigan Association; E. Guy Sutton, Executive Secretary of the National Association, and Harry Donnelly, President of the National Association, present.

Mr. Baker was selected as Chairman of the committee, and Mr. Sutton as Secretary. After a careful consideration and discussion of the sand and gravel tuation, it was unanimousfreight r. ly determined by the Committee that the following recommendation should be made to the National Committee for its consideration and adoption, as follows:

- 1. That necessary steps be taken to secure immediate reduction and modification of freight rate on sand and gravel shipments.
- a. That the initial action be by way of application for relief through District Freight Traffic Committees.

- b. That failure to secure relief through District Freight Traffic Committees be followed by application to the Interstate Commerce Commission.
- 2. That a standard or uniform basis of freight rates on sand and gravel shipments be established, and that such basis should be a per ton per mile basis, the application of which should be by zones.
- 3. That the producers of each Freight Traffic District immediately make recommendations to their respective Freight Traffic Committees for the adoption of a uniform basis and as to what rates should be applied in that particular district, taking in consideration what the business will stand, due consideration being given to local competitive conditions.
- 4. That a permanent committee be appointed to secure accurate data and statistics of national scope, reflecting upon freight transportation charges on sand and gravel as compared with freight transportation charges on other commodities, such data to be available for the use of the members of the National Association in their efforts in the several districts for an equitable modification and maintenance thereof of freight rate on sand and gravel shipments.

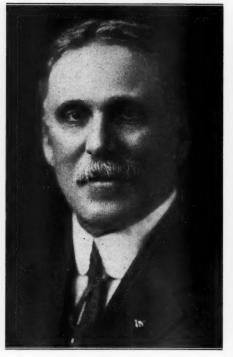
Respectfully Submitted,

Guy C. Baker, Chairman. H. D. Conkey, Geo. V. Miller, E. Guy Sutton, Secretary.





W. P. Carmichael Secretary-Treasurer



H. C. Huffstetter President



M. A. Neville Vice-President

Indiana Gravel Producers to Press Charge of Discrimination in Freight Rates

Petition to Be Placed Before Authorities with Power to Correct Unfairness—Every Angle of Problem Discussed at Two-Day Convention—New Officers Elected— How to Make Good Gravel Roads—An Interesting Program

THAT the sand and gravel producers have been discriminated against in the matter of freight rates and that a petition charging such discrimination be prepared and laid before railroad and governmental authorities clothed with responsibility and power to adjudicate the matter was the consensus of the Indiana Sand and Gravel Producers' Association at its fourth annual meeting at Indianapolis, January 21 and 22 in Hotel Claypool.

Such was the vote of the gathering. It was the one point that all agreed upon. But when it came to the question of what system of rate-making should be approved, the opinions were various and uncertain. Whether a zone-system, a per ton-mile system or some other system would be best for the industy none dared take a positive stand. It was feared that where one system would be fair to one section or one group or one plant, it might be disadvantageous to another. A plan of rates of universal application was to most

minds an impossibility: each region it was felt should be considered separately.

Regarding the present rates, it was repeatedly stated that many producers would probably be put out of business if continued: if the rates were raised as had been hinted as a probability, they would certainly have to shut down their plants.

Railroad Men Keeping Rates Up

The freight rate question was the recurring subject of the two days. President George V. Miller, in his annual statement, spoke briefly on the railroad question as follows:

"We have been in the habit of blaming and criticising the government for our present freight rates and other handicaps forced upon us during the war. But we are wrong.

"The railroad officials, who are railroad men, have been in charge of the transportation system as in former years, and they, seizing the opportunity caused by the war, have boosted the rates and they don't want the rates to come down."

Baker Wants Unified Action

Guy C. Baker, executive secretary of the Ohio Sand & Gravel Producers' Association, told concisely of the freight rate fight, the producers' failure to have justice done, and urged that producers drop their "kid-glove" methods of trying for a re-adjustment of rates and adopt a more aggressive style—"rough stuff," he called it.

"We need unified action," he declared, "and I would suggest that all our associations get together, decide on what to do and then act."

Proposes Zone-Rate Plan

Recently he presented to the Central Freight Traffic Committee of the railroad administration a zone-rate plan. This proposal (see table A and B) was made by Mr. Baker on figures furnished by the Greenville Gravel Co., which operates nine plants in four different states.



G. J. Nattkemper **Executive Committee**



Rock Products

O. G. Knoepfle **Executive Committee**



George V. Miller **Executive Committee**

These figures are based on an average of 1, 2 and 3 road hauls in 1917, upon total ton miles of 31,000,000, upon total revenue to the company of \$31,000,000 and upon total revenue to the railroads of \$250,000. Seven railroads participated in this revenue. Table C is that suggested by a railroad man.

Mr. Baker declared that with lower rates, the Greenville company could double the railroad's revenue. He showed how the railroads, if they persist in high rates for sand and gravel, will face a steadily decreasing revenue, because the scientific plant will be put out of business and the side-of-the-road plant, with bank-run, unwashed, unscreened, ungraded, inferior material will be used. In fact, the side-of-the-road plant is already here and is increasing in numbers.

Sutton on Situation

E. Guy Sutton, Executive Secretary of the Indiana association, stated that the experience of the past eight months in the freight rate fight was discouraging. No satisfactory progress could be made with the railroad officials. C. J. Brister, chairman of the Central Freight District committee had promised to call a meeting of producers, and said he might call it for the day following the National convention in Chicago.

"There are three ways to meet the present situation," said Mr. Sutton. "First, we may continue with Mr. Brister's committee. Second, we may go to the Inter-State Commerce Commission. Third, we may simply ask that General Order No. 28 be modified."

August G. Gutheim, of the Division of Operation, U. S. Railroad Administration, advised going straight to the

President Miller said: "It will cost \$10,000 or more to take the case to the Inter-State Commerce Commission and it will take a long time. The season would be over before we could get a decision. I favor using pressure on Mr. Brister and other railroad officials, and at the same time preparing our petition to go before the I. C. C. We may have to go there finally anyway."

In the afternoon, a special committee headed by G. J. Nattkemper reported its recommendation which was that a petition be prepared charging discrimination against sand and gravel industry

Inter-State Commerce Commission. He also stated that he felt certain that action and satisfactory results could be gotten by a conference with Mr. Chambers at Washington. He called Mr. Chambers a fair man who would certainly deal fairly with producers of mineral aggregates.

The Resolution Offered

in General Order No. 28; that whereas Dronged Zone System Pates

Pro	posed	Zon	e-Syst	tem k	ates
4	1		В		C
Miles	Rate	Miles	Rate	Miles .	Rate
5	20	10	25	25	40
10	25	20	30	30	45
20	30	30	35	40	50
30	35	40	40	50	55
40	40	50	45	60	60
50	45	70	50		65
70	50	90	55		70
90	55	120	60		75
120	60	150	65		80
150	65	180	70		85
200	70	200	75		90

Tables A and B proposed by Guy C. Baker of Greenville Gravel Co. Table C suggestion of a railroad man.

other rates were increased but 25 per cent, sand and gravel were required to pay an additional 20 cents a ton, making an increase up to 120 per cent.

Mr. Nattkemper said: "In making rates, railroad officials must consider these four questions: 1. Cost of hauling material. 2. Competition. 3. Density of traffic. 4. Return of empties. All these have a bearing on rates.

"This committee was uncertain what system of rate making to adopt and thought best to proceed by making this charge of discrimination. On this basis we can get a hearing; if we ask for a reduction we stand little show. But if we prove the discrimination, that high rate increase will be probably removed and the 25 per cent advance substituted."

Railroad Men Win Either Way

"Railroad men want high rates," declared Mr. Sutton, who read the resolution. "If the railroads are turned back to private owners, the owners win. If the roads are not turned back, and the government continues operation, they, the railroad men, don't lose. Heads or tails they win.

"The great question in my mind is should we now fight for a permanent rate or simply to remove the discrimination under which we are suffering. Conditions are so uncertain in railroads. owing to question of future ownership, that it is doubtful if a permanent rate can be fixed now. We need immediate relief, and I believe we should go to Mr.

W. P. Carmichael said he was not sympathetic to the public cry for a reduction of rates. He cited the advance

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in prices of commodities as proving high freight rates are necessary.

Want Permanent Rates Fixed

"Your grief is not with the government," said Mr. Miller. "These freight rates have been brought about by the great railroad officials, as anyone who knows anything about the situation is aware. I believe the railroad officials have it in their minds to give us a different system of rates. They want a rate for all time. They are disgusted with the old system. Whether the government or private interests run the railroads the rates are not coming down."

C. F. Iszard of the De Frain Sand Co., Philadelphia, said eastern producers have been so busy filling war orders they had given the freight rate question little thought, but are now beginning to give it attention.

Producers and Tests

In his annual address, President Miller warned against the indifference producers have exhibited regarding scientific tests and experiments with sand and gravel made by universities and governmental departments. He spoke of a test at the Purdue university, which appeared to him unfair. A block of gravel concrete subjected to a testing apparatus wore one inch, while a similar test on limestone concrete showed a wear of only one-half inch. However the conditions he declared were not alike, the gravel used was bank run, unscreened and unwashed and had been given only a 28 day cure. The gravel really had no wear, the gravel being merely displaced.

Rock Products

"Executive officers of associations," he said, "should look after tests and producers should always be on the job. The use of bank run material against a clean aggregate is not fair. Clay should never be permitted as a binder.' Points on Gravel Roads

R. C. Yeoman, associate professor of Highway Engineering at Purdue University, read a brief paper on "Gravel Road Education." He was followed by Floyd Million of Cicott, Ind., an original investigator and experimenter, talked on "Gravel Roads." He had been recommended to the program committee by Professor Yeoman and everyone was highly pleased after hearing Mr. Million.

He declared that no pebble larger than 134 in. should be used in a gravel road: that the ideal proportions are from 20 per cent sand and 80 per cent gravel to a fifty-fifty mixture. In the latter mixture 70 per cent of the sand must be retained on a 1/8 in. screen and only a small amount of sand that can go through 50 gauze should be used.

He objects to big stones because they work their way up and stick up. He objects to clay as an unsatisfactory binder and the ruination of a road. When clay freezes it slacks. One reason for his objection to big pebbles is that after a freeze the big stones during the thawing crowd their way up in the loosened earth, and they come up un-

Cost Accounting

G. J. Nattkemper told the producers how the Government saved money for the coal producers by compelling the installation of a proper cost accounting

system. "The coal producers are now making more money," he asserted, "than they ever did before by any other sort of scheme." On his motion a committee will be appointed to help the members to install the association cost accounting system properly.

Emsley Johnson, county attorney of Indianapolis, explained the proposed "County Unit Road Bill" and L. H. Wright, chairman of the State Highway Commission, "State Highway Legisla-

At the annual dinner Tuesday evening, the members were treated to two wonderful addresses. August G. Gutheim of the Division of Operation of the Railroad Administration, Washington, D. C., told about the troubles of the railroads, which could not be given publicity during the war and which explained satisfactorily much of the criticism that is heard. Dr. O. D. Odell, pastor of the Second Presbyterian church, who had been engaged in Y. M. C. A. work in France, spoke of "My Experiences in France." These were interesting, enlightening and thrilling.

New Officers

Officers for 1919 were elected as follows: President, H. C. Huffstetter, Indianapolis; Vice-President, M. A. Neville, Lafayette; Secretary-Treasurer, W. P. Carmichael, Williamsport. Executive Committee: O. G. Knoepfle, Warsaw; George V. Miller, Indianapolis; E. L. Shaneberger, Terre Haute; G. J. Nattkemper, Terre Haute; James Nugent, Evansville.



Banquet scene of Indiana Sand and Gravel Producers Association at Hotel Claypool, Indianapolis, January 21

29, 1919

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Michigan Sand and Gravel Producers' Association In Arms Over Freight Rates

Decides to Act at Once with Committees of Indiana, Ohio and Illinois Associations

TO FIGHT FOR JUSTICE in proposed freight-rate revisions the Michigan Sand and Gravel Producers' Association at its annual meeting in Detroit, January 23, appointed a traffic committee to get busy at once with similar committees of the Indiana, Ohio and Illinois Associations. This committee consists of Guy C. Baker, of the Detroit-Greenville Gravel Co., and the Kalamazoo-Greenville Gravel Co., W. F. Bradley, of the Ohio and Michigan Sand & Gravel Co., Toledo, Ohio, and Horatio S. Earle of the Genesee Gravel Co., Detroit.

The Case Against the Government

Mr. Earle summed up in an admirable manner the case of many an operator. The war having ended and the time of readjustment having arrived, Mr. Earle wrote to the proper railway authorities for a return to a freight-rate differential agreement which was very vital to the success of his enterprise. Suffice to say the Railway Administration's answer was anything but satisfactory, and to relieve his mind on the matter Mr. Earle penned the following reply-which he deemed a waste of time to send (note the dates):

"Yours of January 15th, acknowledging receipt of ours of November 27th, 1918, at hand.

"You say 'it does not appear to this committee that the rates should be changed at this time merely because you had an old adjustment, or agreement, which the advances made under General Order No. 28 did not follow:' also 'It has been suggested to us that the agreement originally made between you and the Pere Marquette at the time that you began operating the pit would hardly be expected to run indefinitely.'

"The writer is surprised to know that a man holding a Government position in this liberty loving country of the United States of America will deliberately intimate that an agreement is a mere scrap of paper and can hardly be expected to prevail.

"We made an investment of over one hundred thousand dollars based on an agreement with the Pere Marquette, that our rate into Detroit and other Wayne County stations on the Pere Marquette, be, for all time, only five cents per ton more than the first zone rate into De-

"You as a Government official, in my



C. N. Ray

opinion, should be teaching citizens and corporations, how to honorably live up to and carry out agreements instead of hinting that agreements amount to noth-

"If we took money from the railroad or from the Government that belonged to the railroad or the Government by agreement, we would be taking that which did not belong to us and would have to pay the penalty.

"By the so-called General Order No. 28, the railroad or the Government is taking from us the benefits of a bonafide agreement, and you, a Government official, are trying to make us believe that it is all right.

"You cannot do it.

"It is as necessary for the railroad or the United States Government to live up to and carry out an agreement as it is for an individual or a corporation; and again, I must say that I am surprised and astonished and almost dumbfounded to receive a letter from an United States Government official who treats an agreement so lightly.

"We cannot expect to get any justice as long as matters of this kind are in the hands of men who have your views regarding agreements."

The applause with which these remarks were received showed how heartily they were endorsed by all present. Baker Argues Seriousness of Situation

Guy C. Baker, of the Greenville Gravel Co., Greenville, Ohio, which has subsidiary companies in three states, presented the subject of freight rates in such clear and forcible manner that the Association was aroused to immediate action. He outlined the history of the case since the increases of last year went into effect-a record of unfulfilled promises and of passing-the-buck on the part of the Railroad Administration. Mr. Baker is a lawyer and has given practically all of his time for the last six months to a study of how the present and the proposed new rates would affect the business of his companies.

Mr. Baker made it absolutely clear to all present not only that any increase in present rates would be fatal to the industry, but that the present high rates were already working incalculable harm. He gave specific instances of contracts recently let in Ohio which had all gone to local side-of-the-road material, to the ultimate detriment of both the pavements to be built and to the sand and gravel industry.

Old Officers Re-elected

Since its organization last fall the Association has gained two new members, making 23 in all. The following officers were unanimously re-elected: President, C. N. Ray, United Fuel & Supply Co., Detroit; vice-president, W. O. Smith, Detroit-Oxford Gravel & Stone Co., Oxford; secretary-treasurer, Jno. S. Porter, Huron Shore Gravel Co., Saginaw. Mich. The following were elected members of the executive committee: G. A. Glarum, Hersey Gravel Co., Evart; F. D. Coppock, Greenville Gravel Co., Greenville, Ohio; H. P. Belknap, Belknap Cement Products Co., Greenville, Mich.; W. F. Bradley, Ohio and Michigan Sand & Gravel Co., Toledo, Ohio, and N. H. Battjes, Battjes Fuel & Building Material Co., Grand Rapids, Mich.

A committee of three was appointed on legislation. The object of this committee is to have the state system of rewards to counties and townships for roads built changed so that gravel macadam roads will receive the same award as limestone macadam.

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The Merchandizing of Sand and Gravel

Taking Commercial Advantage of the Peculiarities of Your Deposit

HOW TO MAKE the most of a deposit of sand and gravel is just as much a question of good business and good merchandizing as the manufacture and sale of any other commodity. Failure to appreciate this is probably responsible for the failure of many sand and gravel enterprises.

The success of more than one large gravel enterprise is due to the recovery and crushing of boulders, which not so very long ago were cast aside as useless. For concrete aggregate and railway ballast you can't have too many boulders. One of the most successful gravel men in business today will not touch a proposition which does not run half stone—pebbles and boulders over 1½ in. The same man, by the way, will not start a development until he has practically sold the projected production—and he has a score or more very profitable plants.

Clay is usually looked upon as a poor ingredient in a sand and gravel deposit. The more finely divided and distributed it is the harder it is to get rid of. On the other hand a clayey gravel has its purposes and they can be used to advantage in many cases.

An enterprising gravel man in Alexander County, Illinois, has a clayey de-

posit of sand and gravel, which would be the despair of a producer of concrete aggregate or railway ballast. Nevertheless he will probably make more money out of it than most other gravel producers are making.

He found that the farmers of Alexander County had long ago discovered the gravel-road building properties of a certain gravel deposit, which he estimates contains 40 million tons. So, having acquired the property he proceeded to exploit the material by modern merchandizing methods. He had an analysis made by a well-known firm of testing engineers, who gave him the following report:

	Chert	Clay
Moisture		0.6
Loss on ignition	1.17	
(Carbon dioxide, water, etc.)		1.2
Silica		82.78
Alumina Iron Oxide	3.37	10.99
Lime		1.6
Magnesia		0.49
Alkalies and undetermined	.20	2.2

The sample in question contained 82.3% stone (Chert), and 17.7% clay. We understand that this material is found in the upper Devonian Age in Union and Alexander Counties in Illinois, and that a large quantity is shipped to Mississippi and other Southern States, and used for making hard roads. The alternation of hard and soft layers offers a particular advantage for road

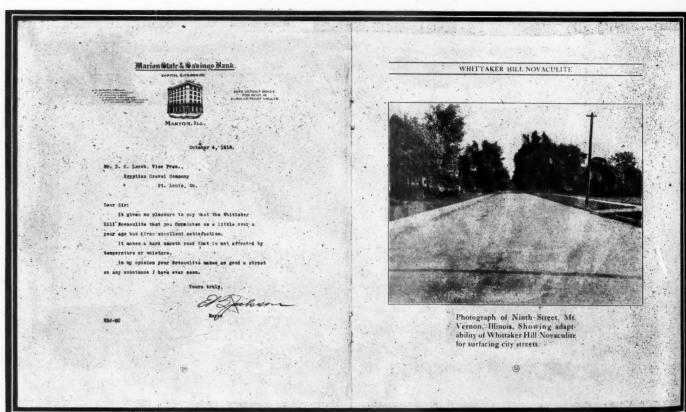
making, the softer material acting as a binder, while the hard fragments of Chert take the wear under the traffic. These beds of Chert occur as high as 250 feet in thickness. We do not see that the clay material is in the least objectionable, but on the contrary we believe it will act as a binder and might possibly be increased.

He then had tests made by State and Federal Highway Burcaus, which gave the following mechanical anlysis:

GRANULOMETRIC ANALYSIS OF WASHED GRAVEL

assing	2	inch	screen	١.															1000%
66	134	4-6	46																97%
6.6	11/2	4.6	4.4																87%
6.6	11/4	6.6	5 66																81%
4.6	1	66	44				٠		٠	٠								۰	68%
64	3/4	64	6.6											0					49%
6.6	1/2	6.6	66		0						0								31%
6.6	1/4	66 .	66			0										0			13%
44	. 1/8	64	Sieve										0			٠			6%
64	1/10	64	44					٠			۰	٠	0						4%
6.6	7/8	44	4.6																
Cementi	ing va	ilue .												. 1	7	e	r	ÿ	good

And then our promoter gave his material a copy-righted trade-mark "Wittaker Hill Novaculite" and proceeded to advertise it as one would some of the various patented types of pavement. In other words he has successfully applied modern merchandizing methods to what some of his contemporaries would probably have termed a dirty gravel deposit not worth development.



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Compact Sand and Gravel Plant

Brighton, Mich., Plant of Greenville Gravel Co., a Typical Coppock Design-Maximum Capacity with Minimum Equipment

THE GREENVILLE GRAVEL CO., of Greenville, Ohio, of which F. D. Coppock is President, is credited with being one of the most successful sand and gravel enterprises in the United States. It is the parent company of a dozen or so Central West plants, all of which testify to the business activity and zeal of Mr. Coppock.

All of these plants are what might be called the "Coppock type," for they represent the summary of his own experience, and his experience has covered very nearly every phase of gravel-plant operation. The essential features of his plants are compactness and simplicity. They have little storage capacity—but they are designed for continuous operation—and no breakdowns—with the least possible operating force.

The design shown is that of the Detroit-Greenville Gravel Co. plant at Brighton, Mich., and a study of it will prove interesting to every sand and gravel plant operator. There is no superfluous housing and no superfluous equipment.

The material enters the plant on a belt conveyor and goes through a cylindrical gravel screen. The oversize is chuted to a stone bin or to a crusher on the ground floor. The crushed material is conveyed by a bucket elevator to a stone screen and there properly sized.

The material passing the gravel screen goes either to the loading bins or to a Cyclone sand screen. This sand screen is below and has its axis at right angles to the gravel screen. The discharge of the sand screen (oversize) goes to a bucket elevator which carries it to a hopper at the top of the plant, where chutes take it to bins or direct to a car-loading chute.

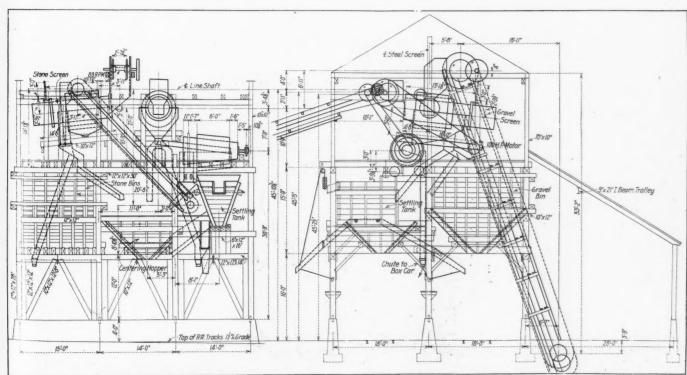
The fine sand passing the screen goes to a settling tank directly below the screen, which also serves as the storage and loading bin. A single 100 h. p. motor drives all the equipment except the crusher and its elevator.

With this simple plant any one of the 17 varieties of washed sand and gravel produced by this company may be turned out. These products are: (1) Asphalt sand—a very fine material used in the construction and repair of asphalt pavement surfaces; (2) washed sand 1/10-in. down—a general purpose fine sand for mason work, plastering, finishing, filler for concrete, where pebbles or stone are used, filter beds, sand cushion for brick pavements, etc.; (3) washed sand ½-in. down with a proportion of fine sand mixed in—a concrete sand, best for con-

crete block making or light ornamental concrete work; (4) washed pebbles 1/10 to 1/4-in., for light concrete work and for road surfacing with tar or asphalt binder; (5) washed gravel 1-in. and down with the proper proportion of sand mixed in; (6) washed pebbles 1/10 to 1-in.; (7) washed pebbles 1/4 to 1-in.; (8) washed pebbles 11/2-in. down, with sand properly proportioned; (9) washed pebbles 1/10 to 11/2-in.; (10) washed pebbles 1/4 to 11/2-in.; (11) washed pebbles 1/4 to 2-in.; (12) washed crushed pebbles (stone) 1/4 to 5/8-in.; (13) washed stone 1/4 to 1-in.; (14) washed stone 5/8 to 1-in.; (15) washed stone 1/4 to 2-in.; (16) washed stone 5% to 2-in., and (17) washed stone 1 to 2-in.

All these sizes and combinations are made by manipulations of the three screens and discharge chutes. Of course all are not made simultaneously, nor can all be made with a day's run of material, but the whole list is quoted to show the flexibility of the simple type of plant illustrated.

As already stated, the design largely embodies Mr. Coppock's own ideas and experience. Most of the equipment and the detailed plans were furnished by the Webster Manufacturing Co., Tiffin, Ohio. The capacity of the plant is about 2,500 tons per 10-hr. day.



Plant of the Detroit-Greenville Gravel Co., Brighton, Mich .- one of the Coppock plants

Ohio Gravel Men Plan Promotional Work

Association in Live Convention Elects Officers — Discusses Freight Rates, Gravel Road Construction and Other Pertinent Matters



F. D. Coppock, President

COLUMBUS, O.—The Ohio Sand and Gravel Producers' Association, which held its annual convention at the Hotel Deshler in Columbus, January 16, elected the following officers for 1919:

President:-F. D. Coppock, Green-ville, O.

Vice-President:-R. E. DoVille, Tolledo, O.

Secretary-Treasurer:—E. S. Warner, Akron, O.

Executive Committee:—E. A. Evans, Zanesville; B. B. Putnam, Marietta; Frank Tejan, Dayton; Harry Donnelly, Cincinnati; Fred Ohlenmacher, Cleveland. Guy C. Baker was selected to act as Executive Secretary for another year.

The question of freight rates took up much of the time at both morning and afternoon sessions, but it was evident that the body could agree on no plan or method of procedure in the light of the little information regarding the matter at hand. It was finally decided to leave the whole freight rate problem to the Executive Committee for disposal.

Executive Secretary Baker brought up the matter of the reported proposal of increasing present freight rates on sand and gravel. Later a discussion on rate plans resulted in a motion from W. Frank Bradley of Toledo to notify the freight rate commission that zones be adopted as the method of arriving at a basis for freight rates and that the zones be 40, 100, 175 and 250 miles.



R. E. DoVille, Vice-President

There was no second to this motion and the subject was dropped until after luncheon, when the matter was left for settlement to the Executive Committee. H. B. Hoel of Greenville introduced



Guy C. Baker, Executive Secretary



E. S. Warner, Secretary-Treasurer

the subject of promotion. B. B. Putnam suggested that a pamphlet describing the best method of building gravel roads be distributed among township trustees and boards of county commissioners. Mr. Baker stated that an article on construction and maintenance of gravel roads now in preparation by Mr. Hinkle of the State Highway Department would be issued by the Association as propaganda.

A motion to make the 1919 assessment large enough to include the \$500 fee for the Association membership in the Ohio Good Roads Federation was adopted.

The Executive Secretary reported that in his opinion the present state laws were ample to protect the material men on public works.

Other speakers were F. E. Hall and George Walker, Cincinnati, and C. W. Purdy of Killbuck, who talked on credit reporting; E. C. Bradley, Toledo, on Labor; B. B. Putnam on "Comfort of Employees," and E. A. Evans on the "Future of the Better Type of Gravel Road."

The gathering was alive and enthusiastic. About 25 representatives of the industry were present.

Mr. Coppock, who was re-elected president of the association is the president and founder of the Greenville Gravel Co., Greenville, Ohio, and associated companies with plants in three states. Mr. DoVille is a former retail building supply dealer and is a past-president of the Ohio Builders' Supply Association.

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Railway Men Would Destroy Mineral Aggregates Industry!

Freight Rates Proposed By Central District Freight Traffic Committee Would Paralize Industry

JUST AS ROCK PRODUCTS was going to press the accompanying schedule of proposed freight rates in the Central District territory reached the office. These rates are more radically increased than was feared. They are the limit. Well posted men in the industries believe that if put into effect they will paralize the mineral aggregates industry. These rates are higher than the rates on coal and iron ore. They are practically the same as the rates now in effect in this territory on cement—a product worth \$18 to \$20 per ton.

Every producer of mineral aggregates—crushed stone, sand, gravel and slag—must buck up and be prepared to put up a stiff fight. By all means communicate with the secretary of your national association now. These proposed rates are practically the same as those proposed in the Eastern District territory (see page 29 of this issue). It shows an organized attempt to soak mineral aggregate producers. Get busy! Do it now!

Lime Association Program

THE LIME ASSOCIATION has secured Lee Welling Squier of Philadelphia to address the annual meeting at Pittsburgh, February 12 and 13, on "Corporation Welfare Systems." This matter was touched on in the splendid analysis of conditions in the lime industry by Charles Warner, published ROCK PRODUCTS of December 18, page 33.

The manager of the Lime Association, Robert F. Hall, in making the announcement states: "This general subject has been reduced to more or less an exact science by certain people interested in the betterment of business. To us, the particular features of this question which are important are Service Bonus Methods, Group Insurance Rates and Compensation Schedules. There is a wide difference in the ways of handling these matters in the several member companies of the Association, and no doubt an address at the annual meeting on this subject would be of interest to many lime manufacturers. Some uniformity of practice in these things would with-

out doubt be advantageous to the industry.

Liability Insurance

Mr. Hall also announces that T. W. Hartley of the United States Fidelity and Guaranty Co. of Baltimore, Md., has agreed to present the subject of group insurance under the various employers' liability laws. Mr. Hall states: "Some member companies are now on the point of renewing their liability insurance. It. is possible that when the advantages are fully understood of combining all of the liability insurance under one head for the purpose of securing a more favorable rate, members who have lately renewed their liability insurance individually will desire to avail themselves of the better rate. If arrangements are made to write a blanket policy covering the entire industry, members who hold unexpired policies will be able to transfer their insurance to the new system without loss of premium, thus availing themselves of the blanket policy arrangement. It is suggested that members carrying liability insurance have this matter well in hand for consideration at the annual meeting.

Association Activities

One session of the annual meeting will be devoted to suggestions and discussion of the activities of the Association. It is felt by the Executive Committee that much good will result. Before the meeting, certain subjects will be assigned to certain individuals to present to the members, and abundant opportunity will be given every man present to express his views fully on the specific subjects presented or upon any other subject that he may have in mind. Every member in good standing is privileged to have his say about the Association, what it has done, what it is doing, and what it should do, and the views of the manufacturers who support the Association are the best possible guide for the Board of Directors and the Executive Committee in administering the Association's affairs. It is earnestly hoped that members will come prepared with helpful suggestions because it is only at the annual meeting that the policies of the Association can be altered, amended or improved in harmony with the wishes of the members.

Rate on Sand, Gravel, Crushed Stone and Slag

	Rate per Net Ton—Single		Rate per Net Ton—Single		Rate per Net Ton—Single
Miles	Line Haul	Miles	Line Haul	Miles	Line Haul
5	45	60	85	175	125
10	50	70	90	190	130
15	55	85	95	205	135
20	60	100	100	220	140
25	65	115	105	240	145
30	70	130	110	260	150
40	75	145	115	280	155
50	80	160	120	300	160
		*	* *		
	Rate per		Rate per		Rate per
	Net Ton-		Net Ton-		Net Ton-
	2 or More		2 or More		2 or More
Miles	Line Haul	Miles	Line Haul	Miles	Line Haul
5	85	60	125	175	165
10	90	70	130	190	170
15	95	85	135	205	175
20	100	100	140	220	180
25	105	115	145	240	185
30	110 .	130	150	260	190
40	115	145	155	280	195
50	120	160	160	300	200

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Mid-West Association of Mineral Aggregate Producers Is Formed

Comprises Three District Associations With Headquarters in Kansas City, Missouri
—Win-the-War Co-operation Bears More Fruit

So MUCH GOOD resulted from the association of crushed stone, sand and gravel men in the 13th district of the Committee on Mineral Aggregates of the War Industries Board, that the organization has been continued and perfected under the name of the Mid-West Association of Mineral Aggregate Producers. Much credit for the successful organization of this new association is due to John Prince, of Kansas City, Mo., Chairman of the War Service Committee on Mineral Aggregates for the 13th district, and to J. H. Allen, of Lincoln, Neb.; C. E. Todd, Kansas City; J. M. Chandler, Tulsa, Okla.; Thomas Sullivan, Omaha, Neb., and R. C. Yant, also of Omaha, who ably assisted Mr. Prince in both the war service committee work and in the organization of the permanent association.

Mr. Prince laid the foundations for the new Association through meetings held under the auspices of the War Service Committee on Mineral Aggregates. Until these meetings neither the quarry men nor the gravel men had a speaking acquaintance with one another. They had never attempted even the organization of local associations. After one or two meetings, which probably 85 to 90 per cent of the producers in the district attended, the atmosphere was so cleared that when Mr. Prince issued a call for a meeting to be held in Kansas City, Mo., January 15, all were unanimously in favor of the following propositions he submitted to them:

Unanimous "Yes" to All of These

1. Do you think a local organization where you will come frequently in touch with your immediate competitor and exchange ideas with him will be of value to you?

· 2. Do you think these local organizations should be combined into a district organization where once a year you can meet with all the producers of mineral aggregate in a district where conditions are similar?

3. Are you favorable to a strong National Association of all producers of mineral aggregate which would have financial strength enough to represent the industry in national affairs, as railroad rates, national road building and general legislation affecting our industry? This could be brought about by



R. C. Yant

an amalgamation of the three present national associations, i. e., National Association of Sand and Gravel Producers; National Crushed Stone Association; National Slag Association?

4. Are you in favor of the "Open Price?" i. e. A frequent interchange of actual prices quoted and sold in your locality and a general interchange of prices for the district?

Nebraska First To Organize

The week before the Kansas City meeting twelve producers in Nebraska met in Omaha and organized the Nebraska Mineral Aggregates Association with the following declared objects:

"To provide an organization for the coöperation of the members and the coordination of their efforts with those of other Trade Associations and the Federal Government in the furtherance of all projects affecting the industry;

"To establish and to maintain the highest standards of business practices, customs and usages among its members, and to promote the interests of the industry in every legitimate way."

The management of the association is vested in an executive committee consisting of a chairman, vice-chairman and four other members of the association. It is the intention to employ a paid secretary. The funds of the association are secured by tonnage assessment on the year's production; the amount of the

assessment is to be determined by the executive committee from time to time, but must be made on the basis that sand shall be assessed one-half the rate on stone, gravel and sand-gravel mixtures.

The officers elected were as follows: Chairman, R. C. Yant, Hugh Murphy Construction Co., Omaha; Vice-Chairman, J. H. Allen, Lincoln Sand and Gravel Co., Lincoln; other members of the executive committee, H. F. Curtis, Lyman Sand Co., Omaha; W. J. Miller, Weeping Water Stone Co., Omaha, and Thomas Sullivan, National Stone Co., Omaha.

Kansas City Meeting

The action already taken by the Nebraska operators in forming a local association was a determining factor in action taken by the Kansas City meeting, January 15. After considerable discussion it was determined to form three distinct district organizations and to combine the three through a coöperation committee into a general association, which would hold at least one meeting annually to discuss the larger problems affecting the industry. The general association can be maintained at little extra expense; one of its functions is to be the arbitration of difficulties which may arise between producers in one or the other of the local organizations.

The management of the Mid-West Association, which includes all three, is in the hands of an executive committee consisting of three members from each of the subsidiary associations. The funds on hand, amounting to several hundred dollars, raised for war service committee work, was turned over to the general association, of which John Prince of the Steward Sand Co., and the Prince-Johnson Limestone Co., Kansas City, was made chairman, and Frank W. Peck, of Kansas City, secretary.

After a discussion of freight rates, operating problems, etc., the meeting adjourned and the three district organizations met. Besides the Nebraska Association already referred to, these new associations comprise the Arkansas Valley Association of Mineral Aggregate Producers, with headquarters at Tulsa, Okla., and the Missouri Valley Association of Mineral Aggregate Producers, with headquarters in Kansas City, Mo.

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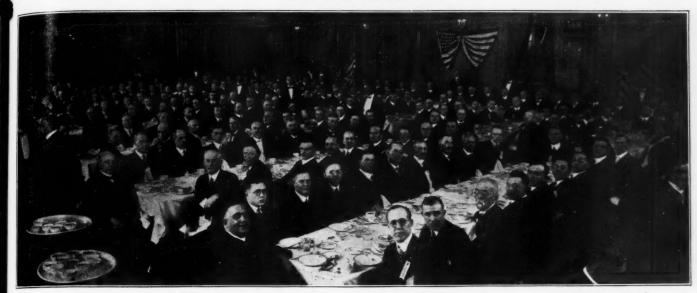
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Ohio Macadam Association Holds Greatest Meeting Ever

Secretary Sandles Provides Remarkable Intellectual Feast of Wit, Wisdom, Patriotism and Good Roads

THE ANNUAL BANQUET of the Ohio Macadam Association is fast approaching the point where tickets will command a premium. This year's attendance of over 300 taxed to capacity one of the largest available banquet halls in Columbus-the Elks Club, on January 21. The gathering included nearly all the members of the state senate, a large share of the house of representatives, road supervisors and county commissioners from all over the state, officials of the state highway department, contractors, and last but not least, the crushed-stone quarry men themselves.

Besides a feed, Secretary Sandles provided a program which held this aggregation spell-bound from 6:30 to 11:30 p. m. Fourteen speakers representing some of the brightest intellect of the state, filled a program that would have been remarkable for any gathering. Really there were fifteen speakers for Mr. Sandles himself as toastmaster gave one of the best addresses-on needed reforms in state legislation affecting the appointment of township road supervisors and the maintenance of roads already built. The other speakers and the subjects assigned to them by Mr. Sandles

"This Good Old U. S. A."-Hon. John E. Sater, U. S. District Court Judge.

"This Good Old Buckeye State"-Hon. Hugh L. Nichols, Chief Justice, Supreme

R. M. Wanamaker, Supreme Court Indge.

"Democracy's Great Highway"-Hon. Maurice H. Donahue, Supreme Court

"Commerce and Transportation"-Hon. John G. Price, Attorney General.

"Rural Welfare and City Meal Ticket" Hon. Timothy S. Hogan, Ex Attorney

"A Common Sense Road-Tax Dollar" -Hon. L. J. Taber, Master State Grange.

"Rural Schools and Rural Roads"-Hon. F. B. Pearson, State School Superintendent.

"The Mud Road Country Home"-Hon. H. E. Bentley, Lawyer.

"Good Roads Licked the Hun"-Hon. T. Alfred Fleming, State Fire Marshal.

"Roads and Loads, the Nation's Need" -Hon. R. C. Cole, Congressman Elect. "Tired, Retired and Rubber Tired Farmers"-Hon. Alfred Vivian, Dean College of Agriculture.

"Steers — Cows — Calves — Roads" — Hon. Tom. D. Harmon, National Stockman & Farmer.

"From Ox Cart to Tin Lizzie"-Hon. John Henry Newman, State Librarian.

While all the speakers did not stick to the subjects assigned to them they all linked the good roads movement with wit, wisdom and patriotism in a manner long to be remembered. The speakers

"The Judge and His Justice"-Hon. and their audience represented a fair share of the leaders and makers of public opinion in the State of Ohio, and for simon pure education such an intellectual feast was worth a term at a university. This method education and this method of influencing legislation, if you will, certainly beats the old-time gum-shoe methods which still prevail to a large extent elsewhere, and certainly marks the Ohio Macadam Association as a model worth exemplifying.

Business Meeting

The business sessions of the annual meeting were largely devoted to discussions of the rumored freight rate increases, fire insurance and employers' liability insurance and accident prevention. A traffic committee consisting of the traffic managers of the France Stone Co., the Kelley Island Lime and Transport Co., and the Marble Cliff Quarries Co. was appointed to formulate a policy to meet railway proposals.

The matter of fire insurance and the advantage of group insurance in a mutual company were thoroughly discussed, but no action was taken. Another jump in the rates for employers' liability and workmen's compensation insurance by the Ohio State Industrial Commission had thoroughly aroused the members of the association to the importance of this phase of plant operation, and a report of the insurance com-

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mittee of the association by D. C. Souder of the France Stone Co., was listened to with interest.

Importance of Accident Prevention

Among other things Mr. Souder said: "It may be well to mention at this time that at the meeting held in May our compensation rate was \$3.85. I inormed the members of this committee that if something was not done to prevent accidents in and about stone-crushing plants that the stone rate would increase. Well, the very same thing came true, as on July 1, 1918, the manual rate for stone quarrying and crushing, with or without blasting, was published at \$4.10-an increase of 25c. You will recall that for the death of an employe the Industrial Commission allows a claim of \$5,000; of this amount \$2,460 is charged to the individual risk or the company that suffered the accident, the balance, or \$2,540, is charged to the stone class as a whole and all of the manufacturers in the stone class, regardless of their experience, help pay for this loss. There is no question but what some stone plants are having bad experience, and the ones with good experience and who are striving and spending money to prevent accidents are helping to pay for the ones that are reckless and care little about the injury to their employes."

Election of Officers

Reports of the secretary and treasurer showed the association in a healthy financial condition, notwithstanding the stress of the times. The Ohio "Macadam Service," a monthly periodical edited by Secretary Sandles and published in the interests of the association, has been practically self-supporting from the start. The assessment for the current year will be on the same tonnage as last year, which was the tonnage report for 1916. This of course is in effect an increase in assessment because the tonnage of 1918 was considerably lower than the 1917 tonnage and still lower than the 1916 tonnage.

All the old officers were re-elected as follows: President, L. H. Hawblitz. France Co., Toledo; 1st vice-president, E. T. Paul, Bluffton-Lewisburg Stone Co., Lewisburg; 2nd vice-president, J. A. Moore, Higgins Stone Co., Bellevue; scecretary, A. P. Sandles, Columbus; treasurer, W. H. Hoagland, Marble Cliff Quarries Co., Columbus. In addition to the above the following were elected trustees: Allen Patterson, Lima, Bluffton-Lewisburg Stone Co.; L. A. Beeghly, Youngstown, Standard Slag Co.; E. E. Evans, Toledo, Whitehouse Stone Co.; J. J. Urschel, Toledo, Woodville Lime Products Co.; A. A. Hall, Piqua, Ohio Marble Co.; W. D. Robinson, Toledo, Toledo Stone & Glass Sand Co.; J. A. McCall, Findlay, Tarbox & McCall; J. F. Pogue, Findlay, Hancock Stone Co.

Hawblitz Misses Big Show

Laid up in Toledo by the "flu" President Hawblitz, much to the disappointment of all, missed the whole "doings." Mr. Hawblitz had been pessimistic enough to express the opinion that the great banquet of last year could never be equalled again. On the motion of A. Acton Hall a telegram of sympathy was sent to President Hawblitz, assuring him that this year's meeting was the best ever, and also assuring him that he had never attended "a real banquet" in having missed this one.

Coming Convention of the American Road Builders' Association

THE NINTH AMERICAN GOOD ROADS CONGRESS and the Sixteenth Annual Convention of the American Road Builders' Association will be held at the Hotel McAlpin, Broadway and 34th St., New York City, February 25, 26, 27 and 28, 1919.

Many problems of the most vital interest and importance are at the present time confronting the road builders of the country. It is proposed, therefore, to bring together those most prominently identified with highway construction, transportation and maintenance for the purpose of considering the questions of the hour.

The program which is now being prepared for the eight sessions of the congress will be devoted to the consideration of highway transportation and the administration, financing, construction and maintenance of national, state, county and municipal highways. Papers by prominent highway authorities and reports on live topics by several committees will be presented for discussion. The general plan contemplates devoting February 25 and 26 to the presentation and discussion of papers and February 27 and 28 for the consideration of reports to be submitted by several committees. The business session of the Association will be held on the afternoon of February 28 and the annual banquet on the evening of the 26th or 27th. It is proposed to show motion pictures pertaining to highways on two evenings during the congress.

Among the subjects which will be presented for discussion are the following:

National Highways and Federal Aid for State Highway Improvements.

Relation of Highways to Railways and Waterways.

Efficient Methods of Contracting for Highway Work During the Reconstruction Period Efficient Methods of Promoting Highway Bond Issues.

Efficient Methods of Drainage for Different Geological Conditions.

Foundations for Heavy Horse-drawn and Motor Truck Traffic.

Methods of Maintaining Highway Systems Prior to Construction by the State or County.

Economic Utilization of Labor Saving Machinery.

Cost Keeping for Highway Contractors.

Street Systems, Their Relation to Highways Outside of Urban Districts.

The Efficiency of the French Broken Stone Roads During the War.

Efficiency of Bituminous Surfaces under Motor Truck Traffic.

Recent Developments in the Construction, Maintenance and Reconstruction of Cement Concrete Pavements.

Recent Practice in the Construction of Stone Block Pavements.

Committees will submit reports on thé following topics:

Regulations Covering Speed, Weight and Dimensions of Motor Trucks.

Methods of Financing Highway Improvements for States, Counties and Towns.

Civil Service Requirements for Highway Engineering Positions.

Sources of Supply of Unskilled Labor for Highway Work.

Convict Labor on Highway Work; Organization, Administration, Camps and Cost Data.

Reconstruction of Narrow Roadways of Trunk Highways with Adequate Foundations and Widths for Motor Truck Traffic.

Methods of Strengthening and Reconstructing Highway Bridges for Heavy Motor Truck Traffic.

Efficient Methods of Snow Removal from Highways Outside of Urban Districts.

Guarantees for Pavements on Roads and Streets.

Uniform Highway Signs.

Next year it is proposed to hold in connection with the convention the most complete and comprehensive exhibit of road machinery, equipment and materials ever seen. At the time, however, it was decided to hold this year's convention in New York City, the war was still in progress and it was felt to be out of the question to have an exhibition on anything approaching a large scale. It was therefore decided to limit this feature to the facilities afforded in the Winter Garden on the top floor of the Hotel McAlpin.

The sessions of the convention will be held in the ballroom, which is also located on the top floor and adjoins the Winter Garden. y 29, 1919

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Cost-Keeping for Silica Sand Plants

Analysis of Silica Sand Operation by Committee on Uniform Cost Accounting of the American Sand Association

THE CONSTITUTION of the American Sand Association-composed of producers of foundry sands-requires the members of the association to adopt a uniform system of cost accounting. The committee of the association appointed to suggest a uniform cost-accounting system reported in part as fol-

The committee "concluded that the greatest skill and caution must be observed in applying the principles underlying cost finding to the conditions that exist. No two manufacturing plants are alike, not even in the same line of business. Every plant has peculiarities that bear upon the methods of cost finding thus making each plant a problem in itself. The knowledge of principles without a corresponding familiarity with the facts and conditions of a particular plant produces a theoretical system which nine times out of ten is not practical.

Since one of the principal functions of a cost system is to analyze the costs into their component parts, it follows that there must be a corresponding analysis of the plant operations. This is accomplished by dividing the plant more or less arbitrarily into operating departments or production centers, the aim being to limit each department as far as possible to simple and uniform operations. The operating department plays a very important part in making up and arranging the cost accounts. It furnishes a center about which various expenses may be grouped and from which the indirect expenses may be distributed over a limited field with a greater degree of

"The direct material and labor charges are not as a rule difficult to compile or distribute and can be accurately determined, but the proper distribution of indirect expenses is difficult and almost all the trouble and mistakes in finding costs are due to this fact. Any method that provides for transforming a large part of the indirect expenses into direct charges attacks the difficulty at its

"The committee felt that it could not devise a system that would be practical at all plants and in lieu of same, submitted a list of all the charges it could think of which would enter into a silica sand company's operations, with the suggestion that each company devise its own system, taking special pains to get every item of expense into its costs.

"Whatever kind of a system is adopt-

ed, every precaution should be taken to avoid making it top heavy. If there is one thing more than another that excites criticism, it is 'red-tape' that does not justify itself in practical results. It may show itself in a mass of undigested reports, troublesome to make up in the plant and impracticable to use in the office, or it may take the form of volumes of data that no one ever looks at. Another form of 'red-tape' not uncommon is carrying small items of cost to such a degree that the process of determining them is more expensive than the costs themselves. In avoiding these pitfalls, the cost accountant will some times appear to be violating the fundamental principles of cost finding when as a matter of fact he is only preventing them from going to seed."

1. Stripping expense:

All labor Steam-shovel repairs Vehicle repairs Stable expense and repairs Locomotive repairs Car repairs Tram track repairs Fuel, oils and waste Miscellaneous tools and supplies

2. Drilling expense: All labor Drill repairs Fuel oil and waste Miscellaneous tools and supplies

3. Dynamiting expense:

All labor Casings Explosives Miscellaneous tools and supplies

4. Quarrying expense:

All labor Pop shooting or spall making Steam-shovel repairs Vehicle repairs Stable expense and repairs Locomotive repairs Cars repairs Tram track repairs Motor repairs Building and machinery repairs Fuel, oil and waste Miscellaneous tools and supplies

5. Crushing expense: All labor Conveyor repairs Hoist repairs Crusher repairs Rolls repairs

Disintegrator repairs

Motor repairs

Motor repairs

Belts and repairs Buildings and machinery repairs Fuel, oils and waste Miscellaneous tools and supplies

6. Washing and screening All labor Conveyor repairs Pump and water-line repairs Belt and repairs Screens and repairs Motor repairs Buildings and machinery repairs Fuel, oil and waste Miscellaneous tools and supplies

7. Drying: All labor Gas-producer repairs Conveyor repairs Belts and repairs Screens and repairs Motor repairs Buildings and machinery repairs Fuel, oil and waste

Miscellaneous tools and supplies Wet material

8. Miscellaneous expense: General labor Supervision Machine shop repairs Blacksmith shop repairs Boiler house repairs Transformer shop repairs Steam line repairs Electric line repairs Tracks repairs Scales repairs

Electric power and light Fuel, oil and waste Miscellaneous tools and supplies Depreciation

Depletion Royalty

All expenses incurred during shutdowns to be prorated as desired. 9. Administrative expense:

Salaries, officers and clerks Rent of offices Telephone and telegraph Stationery and printing Postage Legal expense Subscriptions

> Donations Insurance and taxes Interest and discount

Repairs: buildings and equipment

10. Selling expense: Salaries Traveling Advertising Commissions

Operation of Quarries and Crushing Plants

II-Efficiency of Crushing Machinery

THE CAPACITIES OF CRUSHERS and their adjustment governing the division of work among a series of crushers, are subjects of vital interest to any crushed-stone operator, deserving his closest attention, with a view to getting maximum capacity out of the machines at hand.

Ratio of Reduction

It is generally thought that the capacities of machines are overrated by their manufacturers; this is not quite correct but manufacturers are to some extent to blame for failing to state that capacity depends on size of stone received by the machine as well as the size to which the material is to be crushed, in other words the ratio of reduction. To define the work done by a breaker this ratio of reduction must be known as when 9-in. material is broken to 3-in, the ratio of reduction is 3:1.

Not only is it necessary to keep in mind the maximum diameter of received material but the average diameter. In gravel crushing the rated capacities of machines have been exceeded, even when "some" pieces were as large as the opening of the breakers. We hear of 250 tons of gravel per ten hours being broken to $1\frac{1}{2}$ in. in a No. 3 gyratory from the product of a pit running up to 7 in. Of course, a large percentage of this gravel was already smaller than $1\frac{1}{2}$ -in. and passed through the machines as through a funnel.

If the same machine is fed with only large pieces of the same material, as is the case when the product of the pit is first screened, its capacity is less than 10 tons per hour, and if all pieces are of maximum size the production is still further diminished. In crushing the product of a quarry, it may also be noted that while a load of all large pieces keeps the initial breaker busy for quite a while, a load or two of small material will often flood the elevator or conveyor beneath this unit.

It is true that in jaw as well as gyratory crushers, breaking of large pieces can go on and does go on near the wider top of the opening while the final reduction is being made near the discharge opening. Still, size of material received greatly affects capacity; so much so, in one plant, that a No. 9 which had crushed 190 tons per hour taking its feed from a larger unit reducing to 10 in. could not be made to crush better than 110 tons per hour when fed with the quarry product, the stone

By R. W. Scherer
Supt. of Quarries, Union Lime Co.,
Milwaukee, Wis.

being about 60 per cent larger than 12 in. in smallest dimensions.

Reducing Discharge Opening

But the greater loss of capacity comes from reducing the discharge opening. On the one hand there is the record of one No. 5 gyratory, receiving a quarry product of which no more than 20 per cent is sizeable and reducing 45 tons per hour to 3 in. On the other hand a No. 71/2 gyratory, set to an 11/2 in. opening has never produced more than 30 tons per hour. The explanation is not far to seek; the reduction to minimum size must take place on the bottom two or three inches of head and concaves. Two factors only determine the amount of this breaking that can be done in one machine, the circumference of the head at this point and the revolutions per minute. In the larger gyratories the circumference of the head is greater but the revolutions are fewer; they do very little more of this fine breaking than smaller machines, and yet the amount done at this point limits the capacity of the machine.

It all means that there must be a division of work and that the ratio of reduction to be attempted in a single breaker should be carefully determined to secure maximum efficiency. How far this division of work can be economically carried, that is, how many successively smaller units in a series still effect a saving, can only be determined by the records of such series in large installations.

That some division of work is indispensible even in the smallest plant, there is no doubt. If reduction to a given maximum size is attempted in one machine it is unavoidable, in the nature of things that a large percentage must be reduced to sizes smaller than that maximum. If for example, the largest discharge opening in a No. 4 machine be 11/2 in. the bulk of the product would be finer than 1 in. Theoretically indeed, there would be only one piece in an infinite number that measures exactly 11/2 in. and in practical measurements it is a remarkable fact that only a small percentage of pieces approach the maximum size.

Machinery manufacturers have tabulated the percentages of product through various perforations in Fig. 1. It is based on many observations and is fairly accurate for stone of ordinary friability except that, the diagonals being straight lines, the percentages of successive sizes is the same. From this graph it would appear that, when crushing to 1½ in. there would be 18 per cent above 1¼ in., 18 per cent ranging from 1 to 1¼ in. and the same percentage from ¾ to 1 in., etc. This is not quite correct. Taking the product of a crusher set to 1½ in. maximum opening, and separating into sizes the curve is that of Fig. 2.

Percentages of Sizes

The interpretation of the curve is this, that e. g. 5 per cent of the product passes through a 1/8 in. round perforation; another 6 per cent ranges in size from 1/8 to 1/4 in., giving a total of 11 per cent which would pass through a 1/4 in. perforation. The figures are fairly accurate by quarter inches from actual tests in limestone. It is for this reason that the manufacturers recommend that the machines be so set as to allow 15 per cent of oversize to pass. According to this tabulation and in order to take the curve at its highest point about 21 per cent should be allowed to pass as oversize. This is done by returning the rejections to the same machine, where, their being mixed in with larger pieces is depended on to break them before they again reach the point of discharge, or by a secondary crusher.

The curves for other sizes if determined would be found to have very similar shapes for the same stone. This one, for 1½ in. stone reaches its highest point at 1½ in; the one for 2 in. would be found to turn at 1½ in. and the one for 3 in. to reach its maximum at about 2¼ in. In a question of efficiency of crushers it is essential to remember this fact. The percentages of sizes would also be found to vary in different classes of stone, but only slightly in the most commonly quarried rocks like limestone, granite and trap, though to a greater degree in sandstones.

Auxiliary Crushers Economical

It is for this reason also that the addition of a smaller secondary crusher will often more than double the capacity of a single crusher, if the ratio of reduction is greater than 2:1 in the initial machine. If a No. 6 gyratory or corresponding size of jaw crusher is used to reduce 8 in. stone to a maximum of 4 in., an additional secondary crusher would add

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machine. But if the work of the No. 6 is to reduce 8 in. stone to 2 in., a 4:1 reduction, a No. 4 added to the installation will, with proper distribution of work, double the capacity of the plant.

may help out the capacity of these sec-

ondary machines. (To be continued.)

The next installment of this series will deal with various types of crushers and the different kinds of work they are adapted to.

Manufacturers Should Take Stand on Price Question

CLOSER CO-OPERATION between the manufacturer and the building material dealer in promotional work and in stabilization of prices was urged at the conventions of the National and the Indiana Building Supply Dealers' Associations in Indianapolis, January 20, 21 and 22. Expressions to the effect that neither the price of labor nor of materials was coming down came from every hand. But the great handicap to the development of business was the uncertainty as to these points and also regarding freight rates. Prompt and early establishment of these prices on stable basis was seen as the necessity of the hour.

E. K. Cormack, Chicago, said:

There is doubt in the mind of the building public and while that exists business development will be slow. The banks will not lend money on unstable prices. I believe that prices should be fixed now and hold for one year.

Statements and opinions of the retail

dealer will not have the desired effect in removing the doubt. Here is where the manufacturer can do much to help the development of business. The manufacturers of materials should issue a statement regarding the price situation and then the dealers can give authoritative publicity to the fact that prices are not coming down.

One dealer announced that he believed positively prices were not coming down and to prove his faith in his belief had already stocked up and was ordering on

the present basis.

I am proving to my customers and to the public, he said, that I am not merely talking and guessing. Confidence begets confidence. Let us all prove our faith by stocking up. That will boom busiby stocking up. That will boom business. You can't expect a resumption of business if you leave your store rooms

Rossiter declared that prices of building materials are not high. He said:

Labor constitutes 85 per cent of the cost of construction. Freight rates are also high. Now anyone can figure out from this that materials cost only a small percentage of the whole. But even with labor high, while there is a surplus of labor, we get a higher efficiency from it. You will find that with a labor surplus you will get more and better service from the labor employed.

Officers of the National association

were elected as follows: President, Arthur E. Bradshaw, Indianapolis; Vice-President, Charles M. Kelly, Providence, R. I.; Treasurer, John J. Voelkel, New

10 20 30 40 50 60 70 80 90 106

Fig. 1. Percentages of product through various-sized screen perforations that nothing in plant or quarry delay the crushing machinery; and this makes it particularly difficult to get accurate data.

only its own capacity to that of the first

In records of accomplishment in

plants of this size, there is the report of

a limestone quarry, average bedding of

stone 6 to 8 in. sledged to size of crusher

opening, where less than 15 per cent of

the quarry product is of maximum size

of screen opening, and where one No. 6

as initial breaker and a No. 5 and No. 3

as secondary crushers, are producing

550 tons per ten hours reducing to 21/4

narily produced, had to be further re-

division of work in that rejections above

4 in. were fed to the No. 5 and those

under 4 in. to the No. 3 machine. In

making comparisons of crushers and

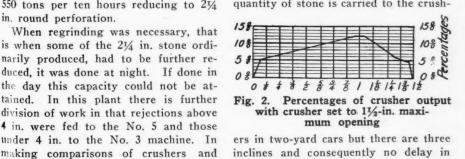
judging the efficiency of a battery of

crushers it is necessary that they be fed

to capacity during the entire run, and

in round perforation.

From a No. 9 plant comes the record of 1500 tons in 10 hours. This quarry has deep bedding, layers ranging from 12 in. up in depth, but hand labor is employed with the result that nothing heavier than "one-man" rip-rap is sent up to the initial breaker, the No. 9 gyratory, and 25 per cent of this quarry product is below 6 in. Two secondary gyratories, both No. 6, reduce the 1500 tons to 21/2 in. round perforation. This quantity of stone is carried to the crush-



ers in two-yard cars but there are three inclines and consequently no delay in feeding. The product of the No. 9 is "scalped" that is sizeable stone removed before being sent to the No. 6's. This

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Manufacture of Carbonic Acid and Other By-Products of Lime Kilns

Process of Collecting and Purifying Waste Gases of Lime Kilns Described in Detail

A CCORDING TO THEIR CHEMICAL FORMULAS high calcium limestone, CaCO₃, contains by weight 56 parts of calcium oxid (quick lime), CaO, to 44 parts of carbon dioxid or carbonic acid, CO₂; while pure magnesite, MgCO₃, contains by weight 40 parts of MgO, magnesia, to 44 parts of carbonic acid (in per cent 47.6% magnesia to 52.4% carbon dioxid). Dolomite, or high magnesian limestone, contains 54% calcium carbonate and 46% magnesium carbonate. Magnesian limestone generally contains between 20 and 45% magnesium carbonate.

It is an established fact that the calcium carbonate can be completely dissociated into the two constituents calcium oxid and carbon dioxid at a temperature of 900 deg. centigrade while magnesium carbonate dissociates at 625 deg. centigrade (approx. 1650 and 1150 deg. respectively in Fahrenheit). This considerable difference in the dissociationtemperature indicates a way in which pure magnesia can be extracted from dolomite. (I shall deal with this matter later on.) The dissociation-temperature of the magnesium carbonate, which occurs in nature as magnesite and of which this country has very rich deposits in California, is so low that this material can be burnt economically in cast-iron (or better cast-steel) retorts to produce pure caustic magnesia and pure carbon dioxid or carbonic acid, which can be immediately liquified.

Apparently also high calcium lime can be dissociated in retorts to obtain a lime which has not been touched by any flame, combustion or sulfur gases, and to produce at the same time pure or almost pure carbonic acid. The waste heat of such retort furnaces can be recovered in modern furnaces to such a degree that the process can be made very economical.

At first, however, I shall deal with the process by which carbonic acid is made from lime-kiln gases, which should contain more than 30% of carbon dioxid. (Measurements on producer-gas fired lime kilns built by the writer have shown an average of 33% CO₂).

In order to extract the carbon dioxid or carbonic acid in a pure state, the kiln gases are first washed in a scrubber, which is a vertical cylinder filled with lumps of limestone, over which water is flowing from the top while the kilnBy E. Schmatolla Consulting Engineer

150 Nassau St., New York City

gases are rising from the bottom; and then the washed gases are blown into a much bigger and higher cylinder or tower which is filled with a column of coke over which a stream of a potassium carbonate solution is flowing while the kiln gases are rising between the coke-pieces.

The potassium carbonate absorbs the greater part of the carbonic acid contained in the kiln gases and potassium bicarbonate is formed, in which, however, the second molecule of carbon dioxid is only loosely bound, and from

which the second carbon dioxid molecule can be liberated in a pure state by boiling at a temperature of 214 deg. F. For this purpose the potassium bicarbonate solution, called the "rich lye" flowing from the absorption tower is collected in a tank and pumped into a boiler where the pure carbonic acid is liberated, to be collected in a gasometer from which it is drawn by a compressor in order to be liquified. The "lean lye" which has been boiled out is used over again for absorbing new quantities of carbon dioxid; the process being a cyclic process.

To illustrate the production of the pure carbonic acid gas from the kiln gases, the writer has drawn the following diagram (Fig. 1), which shows at the left end a lime kiln $B \ C \ K$ with one furnace, which in this case is charged with coke (which

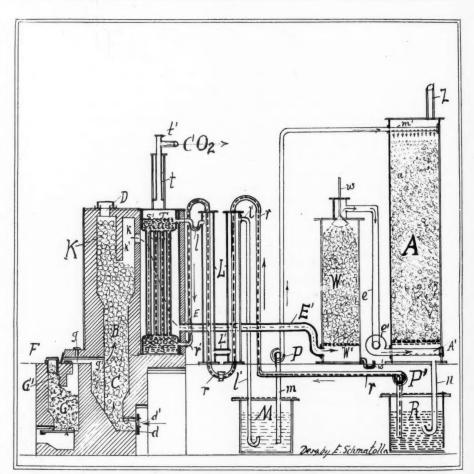


Fig. 1. Apparatus for collecting carbonic acid (CO2) from lime-kiln gases

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is the best fuel for this purpose, as it gives a very uniform and clean fire). Since many coke-oven plants have been built in this country for by-products, coke will be obtainable at a moderate price.

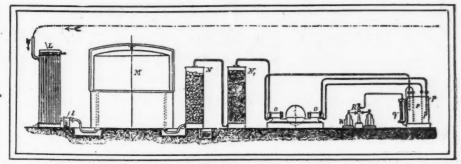
As the diagram shows, the coke or like fuel which is charged through an opening F, is first preheated in a hopper G' before it reaches the fire-box proper G, in which it is consumed or gasified and from which the fire gases pass through one or more flues g g' into the lime kiln where the flames are developed in the burning zone B. The products of complete combustion of the coke contain over 18% by volume of carbon dioxid; to this amount is added carbon dioxid which is liberated from the limestone.

The limestone is fed through an opening D first into a hopper K in which the stone is preheated by radiation through the partition wall k' before it is touched by the kiln gases. This arrangement also gives the advantage that organic matter in the stone is decomposed previous to coming in touch with the gases. The feeding and drawing of the kiln is done semi-continuously, in short intervals of time, and the air which is necessary for the combustion of the coke gas is drawn through the cooler C of the kiln. (The design shown is for high calcium lime; for magnesia lime the design would be somewhat different).

It is obvious that because of the fact that the kiln gases before leaving the kiln at k do not come in contact with green or cold limestone of a fresh charge, the kiln gases will leave the kiln at an almost uniform comparatively high temperature which, however, in this case does not mean a loss, for the waste heat of the kiln is used in the adjoining boiler T for boiling the "rich lye", which therefore does not need a special furnace. The balance of the heat necessary for the liberation of the carbonic acid is supplied in form of waste steam from the compressing and other engines.

In the design shown the boiler is vertical, having lower and an upper chamber T which are connected by tubes through which the "rich lye" rises from the bottom. The waste heat or kiln gases are drawn down between the tubes passing to a pipe E, which is connected with the exhaustor e', located between the scrubber W and the absorption tower A. The pipe E' connects with the scrubber or washer W at the bottom under the grate W' which carries the column of limestone lumps over which water is sprinkled through the shower pipe w. The water takes up the dust and impurities and the lime of the limestone binds the sulfurous acid constituent of the gases, which has not quite been washed away by the water.

Through the pipe e and exhauster e, the washed gas is blown under the grate of the tower A which is filled with coke.



Apparatus for purifying CO, from lime-kiln gases

From the tank M which collects the lean potash lye, the latter is pumped by a pump P to the top of the absorption tower A and by perforated pipes M' distributed over the surface of the coke-column. The coke pieces offer a large surface to the potash lye which is slowly flowing down, while the washed kiln gases rise between the coke pieces that are covered with a thin film of the lye. The waste gas escapes through the outlet z.

The enriched potash lye containing the absorbed carbonic acid flows from the bottom of the tower through the pipe n into the tank R, whence it is pumped through pump P' and pipe line r, r' (marked by a heavy-dotted center line), into the boiler T. Between the pump P' and the boiler T a heat exchange device L is arranged, in which the rich lye takes up the heat from the "lean lye." The "lean lye," after having been boiled out, leaves the boiler through a syphon pipe l, which is connected with the stand pipes L, surrounding the pipes carrying the "rich lye" to the boiler. These exchange devices and economizers can be so arranged that the "rich lye" enters the boiler in almost boiling condition. Before the "lean lye" reaches the tank M, or in the latter, the lye is cooled down to about 100 deg. F., which is the best temperature for absorption.

The liberated pure carbonic acid mixed with steam rises through an economizer or condenser t, from which the condensed steam flows back to the boiler, and flows through a pipe t' to the gasometer M, Fig. 2, from which it is drawn by the compressor.

The second part of the plant is shown in smaller scale in Fig. 2, in which the line marked by the arrows may indicate the connection with pipe t' of Fig. 1.

In Fig. 2, L is an additional cooling and condensing cylinder having a system of cooling pipes; M the gasometer, N and N' are cylinders, one filled with calcium chlorid for drying the gas and the other with charcoal to remove any odor from the gas, O is a compressor for liquifying the gas; P, p a cooler and condensor to cool and condense the gas at the different stages of the compression, and RW is an auto-

matic scale combined with a filling device for filling the liquid carbonic acid into steel cylinders.

(To be continued.)

New Construction Engineer for Lime Association

HARVEY S. OWEN, formerly Engineer of Construction and Principal Assistant Engineer to the Chief Engineer of Construction, Department of the President, St. Louis Board of Public Service, has been added to the staff of the Lime Association, Washington, D. C., as Western District Engineer of the Construction Bureau with headquarters at 906 Forest Park Blvd., St. Louis, Mo.

Mr. Owen has had considerable experience in heavy construction and has spent the last several years in a study and promotion of diversified concrete usage, as well as expert inspection service on concrete highway construction in the middle West.

Mr. Owen is a member of the Engineers Club of St. Louis, American Road Builders Association, Missouri Highway Engineers Association and American Concrete Institute.

Lime Value Shown in New York

FIELDS TREATED WITH LIME produced an average of 11/2 tons of cured hay an acre more than unlimed fields in tests of ground limestone, burned lime, and hydrated lime, conducted by the farm bureau through the county agent in Chemung County, N. Y. A farmer who used 1 ton of ground limestone to the acre secured 4,850 pounds of cured hay, compared to 1,208 pounds an an unlimed acre. Another, who applied 700 pounds of hydrated lime to an acre, obtained 6,292 pounds against 1,461 pounds on an unlimed acre. A third farmer used 1 ton of burned lime to the acre and obtained 3,400 pounds, compared to 1,040 pounds on unlimed land .- "Food and Farming Weekly," No. 33,, U. S. Dept. of Agriculture.

Portland Cement Production in 1918 Shows 20 Per Cent Decrease

War Sets Industry Back to 1909 Figures; Prices Up 17 Per Cent; Two New Producers and Six Idle Plants

STATISTICS AND ESTIMATES of the production of Portland cement in 1918 compiled under the direction of Ernest F. Burchard, of the United States Geological Survey, Department of the Interior, shows a marked decrease in total output; in fact the output was the lowest since 1909.

The estimated shipments of Portland cement in 1918 amounted to 71,645,000 bbls., valued at \$113,910,000, compared with 90,703,474 bbls., valued at \$122,775,-088 in 1917, a decrease in quantity of 21 per cent and in value of 7.2 per cent. The estimated production in 1918 was 71,632,000 barrels, compared with 92,-814,202 barrels in 1917, a decrease of 22.8 per cent. The stocks at the mills increased from 10,462,882 barrels in 1917 to about 10,594,000 barrels in 1918, or 1.3 per cent.

The exports of hydraulic cement from the United States for the first 11 months of 1918 amounted to 2,025,178 barrels, valued at \$5,257,285, or \$2.59 per barrel. The exports for the whole year 1917 were 2,586,215 barrels, valued at \$5,328,536, or \$2.06 per barrel. The export trade also therefore fell short of that for 1917.

The decrease in output was the effect of the war restrictions imposed by the Government upon fuel supplies, transportation facilities, labor, and private construction work in general, and the extent to which the cement industry in the several States and districts suffered is indicated in the accompanying tabular statements. Not a single State or district made an increase in the shipment or production of Portland cement in 1918; in many the decrease was near the average; in only a few was it less than 15 per cent or more than 30 per cent. Despite the universal decrease by States and districts an increase in output was made by individual companies in Colorado, Indiana, Iowa, Michigan, New Jersey, New York, Ohio, Oregon, Pennsylvania, Texas and Virginia and many of the companies whose output decreased nevertheless regard the year's business as profitable on account of the higher prices they received for their product.

According to reports, two new plants produced Portland cement in 1918—the Old Mission, at San Juan de Bautista, Cal.,

and the Three Forks, at Hanover, Mont.—six plants were idle during the year, one each in California, Kansas, Michigan, Nebraska, New Jersey, and New York. The total number of producing plants in 1918 was 114 and the total number of plants that shipped cement was 115.

The average factory price per barrel for Portland cement in bulk in 1918 ranged from \$1.34 in the Tennessee-Alabama-Georgia district to \$1.91 in California, compared with a range from \$1.22 in the Lehigh district to \$1.69 in

Washington in 1917. The average price for the whole country was \$1.59 per barrel in 1918, compared with \$1.354 in 1917, an increase of 23.6 cents, or 17.4 per cent.

The wholesale market price of Portland cement per barrel at New York City during 1918 ranged from \$2.14 in January to \$2.90 in September, compared with a range from \$1.92 to \$2.12 per barrel in 1917, and with a practically stationary price of \$1.58 in 1913 and 1914, an increase during the period of the war of about 84 per cent.

Estimate of output of Portland cement in the United States in 1918, with actual figures for 1917, by States.

State.	1917	1918	Percentage of change in 1918.	Average factory price per barrel in 1918.	Percentage of change in price in 1918.
California: Shipments. Production. Stock Ulinois:	Barrels. 5,659,547 5,653,362 480,073	Barrels. 4, 209, 000 4, 432, 000 526, 000	- 25.6 - 21.6 + 9.6	\$1.906	+45.
Shipments Production. Stock	4,378,233 4,659,990 805,763	3,696,000 3,589,000 671,000	- 15.6 - 23.0 - 16.7	1. 405	+ 1
Shipments. Production. Stock.	8,148,678 8,705,831 1,760,101	6,248,000 5,323,000 815,000	- 23.3 - 38.9 - 53.7	1.544	+13.
Shipments. Production. Stock. Kansas:	4, 428, 765 4, 626, 141 618, 811	3,203,000 3,702,000 1,095,000	- 27.7 - 20.0 + 77.0	1.706	+10.
Shipments. Production. Stock. Michigan:	3,772,884 4,015,169 452,835	2,601,000 2,520,000 334,000	- 31.1 - 37.2 - 26.2	1, 595	+14.
Shipments Production. Stock. Missouri:	4,313,771 4,688,899 713,796	3,577,000 3,808,000 904,000	- 17.1 - 18.8 + 26.6	1.664	+17.
Shipments. Production. Stock. New Jersey:	5,800,988 5,882,240 403,424	4,521,000- 4,750,000 628,000	- 22.1 - 19.2 + 55,7	1.603	+12.
Shipments. Production Stock. New York:	2,397,069 2,449,876 237,554	(a) (a) (a)	(a) (a) (a)	(4)	(a)
Shipments. Production. Stock. Ohio:	5,408,726 5,417,530 808,328	4,141,000 4,150,000 778,000	- 23.4 - 23.4 - 3.8	1, 616	+23.
Shipments. Production Stock. Oklahoma:	1,565,394 1,566,209 129,838	1,280,000 1,469,000 327,000	- 18.2 - 6.2 +151.9	1.504	+ 1.
Shipments. Production. Stock. Pennsylvania:	1,736,761 1,772,466 70,708	1,278,000 1,183,000 44,000	- 26.4 - 33.3 - 37.8	1.713	+13.
Shipments. Production. Stock.	27,709,442 27,752,838 2,412,247	22,557,000 22,641,000 2,795,000	- 18.6 - 18.4 + 15.9	1. 520	+22.
Shipments. Production. Stock. Utah:	2,358,944 2,436,398 222,537	1,926,000 1,996,000 272,000	- 18.4 - 18.1 + 22.2	1.713	+10.
Shipments. Production. Stock. Washington:	899,599 929,730 106,590	503,000 494,000 114,000	- 44.1 - 46.9 + 7.0	1. 577	3.
Shipments. Production. Stock. Other States:	1,403,191 1,513,792 385,707	1,111,000 1,037,000 237,000	- 20.8 - 31.5 - 38.6	1.852	+ 9.
Shipments. Production. Stock.	10,721,482 10,743,731 854,570	10,794,000 10,538,000 1,054,000	- 17.7 - 20.1 - 3.5	1. 574	+17.
Total: Shipments. Production. Stock.	90, 703, 474 92, 814, 202 10, 462, 882	71,645,000 71,632,000 10,594,000	- 21.0 - 22.8 + 1.3	1,590	+17.

a Included with "Other States." b 1917: Alabama, Colorado, Georgia, Esatucky, Maryland, Minnesota, Montana, Nebraska, Oregon, Tennessee, Virgini and West Virginia. 1918: New Jersey Included; Nebraska omitted. . 1919

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District.	1917.	1918.	Percentage of change in 1918.	Average factory price per barrel in 1918.	Percentage of change in price in 1918.
Lehigh district (eastern Pennsylvania and western New	. 1				
	Barrels.	Barrels.			
	24, 423, 641	19,645,000	-19.6	*\$1,532	+25.
	24, 423, 507 2, 163, 395	19,679,000 2,480,000	-19.4		
Stock	2, 103, 393	4, 100,000			
New York State: Shipments	5, 408, 726	4,141,000	-23, 4	1.616	. +23
	5, 417, 530	4, 150, 000	-23.4		
Depair	808, 328	778,000	- 3,8		
	2 010 001	0.004.000	11.0	1 500	
Chipmonts	7, 248, 264	6,234,000	-14.0	1.000	+ 8
Production	7,345,416 616,244	6,481,000 910,000	+47 7	1.500	********
Production. Stock. Michigan and northeastern Indiana:		310,000			
	4,835,304	4,140,000	-14,4	1.655	+16
Production	5, 263, 810 882, 421	4,371,000	-17.0		
Ctool:	882,421	1,064,000	+20.6		********
	2,386,347	2,000,000	-16.2	1 508	- 19
Shipments	2,517,257	1,639,000	-34.9	2.000	7.40
Production	611, 199	249,000	-59.3	1.598	
Stock Illinois and northwestern Indiana:					
Chinmonts	10, 233, 233	7,897,000 7,156,000	-22, 8	1.466	+7
Deschaption	10,927,990	7, 156, 000	-34.5		
Stock. Maryland, Virginia, and West Virginia:	1,889,763	1,110,000			
Maryland, Virginia, and West Virginia:	3,109,098	2,361,000	_24 1	1 620	± 26
Shipments	3,122,936	2,313,000	-25, 9		
Stock	305,948	241,000	-21.2	1.629	
Tonnessee Alabama and Georgia:					
Shinmont :	3,686,359	3,275,000	-11.2	1.337	+ 8
	3,676,354 220,582	2,992,000 80,000	-18.0		
Stock Iowa, Missouri, and Minnesota:	220,082	50,000	1	1	
Shipments	11,510,753	8,837,000	-23, 2	1.646	+10
	11,774,381	9,561,000	-18,8		
Stock Nebraska, a Kansas, Oklahoma, and central Texas:	1,123,654	1,923,000	+71.1		
Nebraska, a Kansas, Oklahoma, and central Texas:	2 405 415	r 407 000	200 0	1 640	+13
Shipments. Production	7, 405, 415 7, 710, 365	5,437,000 5,316,000	-20, 0	1.049	+40
Production	686,390	600,000	-12 6	1, 649	
Rocky Mountain States (Colorado, Utah, Montana, and	000,000	000,000	100		1
			1		1
Shipments	3,197,284	2,150,000	-32, 8	1,818	+ 5
Production	3,261,675	2,242,000	-31.3		
Stock	263,063	358,000			1
Pacific Coa t States (California, Washington, and Oregon): Shipments.	7,259,050	5,528,000	-23.8	1.809	+35
Production	7,372,981	5,732,000	-22.3		
Stock	891,895	801,000	-10.2		
-			1		
Tot il	00 702 474	71,645,000	_21 0	1 500	
Shipments	90,703,474 i 92,814,202	71,632,000	-21.0	1,590	+1
Stock	10, 462, 882	10,594,000	+ 1.3		
Stock	20, 102, 0	,,	1		1

Eastern Stone and Gravel Men Discuss Freight Rates

Joint Committee Formed to Formulate Policy—Unofficial Report on Proposed Rates Read

THE SAND AND GRAVEL PRODUCERS of the Philadelphia district have accepted an invitation of Eastern Crushed Stone Producers Association to meet with its members once a month. Such a meeting was held January 8, at which a joint committee was appointed to investigate thoroughly into the new proposed freight rates in the Eastern district on sand, gravel, crushed stone and slag.

The Eastern Crushed Stone Producers Association has already filed a brief with the Philadelphia District Freight Traffic Committee, asking for a reduction in rates, based on the decision of the Interstate Commerce Commission in the now famous Birdsboro Stone Co. case. (See ROCK PRODUCTS, December 18, 1918, p. 19.) No action has yet been taken on this matter, but a promise was made

to come to a decison at an early date.

At this meeting the following schedule of rates for the Eastern territory was reported unofficially as being the schedule which the Eastern District Regional Freight Traffic Committee at New York had recommended, to the Railroad Administration in Washington, last September. As will be seen by examination, these rates are higher than those which it has been rumored are being prepared by the Central District Freight Traffic Committee at Chicago (60 per cent. of the sixth class rate).

The proposed Eastern rates are reported to be as follows:

Miles	Rate	Miles	Rate	Miles	Rate
5	.50	60	.90	175	1.30
10	.55	70	.95	190	1.35
15	.60	85	1.00	205	1.40
20	.65	100	1.05	220	1.45
- 25	.70	115	1.10	240	1.50
30	.75	130	1.15	260	1.55
40	.80	145	1.20	280	1.60
50	.85	160	1.25	300	1.65

A summary of the rates proposed by the Eastern Crushed Stone Producers Association to the Philadelphia District Freight Traffic Committee on December 11, 1918, is as follows:

			Plus 20c per ton Increase	On basis of 25%
	Miles	Rate	June 25	increase
	0 to 10	\$0.26	\$0.46	\$0.325
	11 to 20	.32	.52	.40
	21 to 30	.38	.58	.475
	31 to 40	.44	64	55
	41 to 50	.50	.70	.625
ž	51 to 60	.56	.76	.70
	61 to 70	.62	.82	775
8	71 to 80	.68	.88	.85
	81 to 90.	74	.94	.925
	91 to 100	80	1.00 .	1.00.

It will be noted, according to the reported railway committee schedule, that there is a material reduction over the rates in effect at the present time on the longer hauls say over 50 or 60 miles, these long haul rates lining up fairly well with the rates as proposed by the Eastern Crushed Stone Association based on the I. C. C. decision above referred to when the increase of 20 cts. per ton is added. The short haul rates as proposed by the Regional Freight Traffic Committee are considerably in excess of the proposed rates on the basis of the Birdsboro decision.

Hazards of Cement Making

WASHINGTON, D. C.—Hazards incident to the manufacture of cement are to be investigated by the Working Conditions Service of the Department of Labor, as part of its study into the health and efficiency of workers in industry, for the purpose of determining and eradicating the causes of occupational diseases.

The plan is to go into factories upon the invitation of manufacturers and to follow definite schedules in obtaining information. These studies will be made uniformly throughout the country in plants engaged in similar lines of production, and the facts obtained will be regarded as professional information to be used as the basis for making recommendations for improving working conditions within the plant.

The results of the surveys of all plants in each industry will later be tabulated, affording a basis for ascertaining the causes and consequences of occupational diseases, to combat which methods will then be worked out. Not only is this survey expected to bear results in bettering conditions in the plants investigated at the request of their operators, but it will also form a basis upon which State legislatures may formulate their codes governing working conditions in general throughout the State.

Ground Raw Gypsum As a Fertilizer

Gypsum Industries Association Launches Campaign to Increase the Use of Gypsum on the Farm

HISTORY INFORMS US that Gypsum was used as a fertilizer by the Greeks and Romans more than two thousands years ago. As time went on valuable discoveries were made regarding increased production from the soil through the use of gypsum and these developments have caused it to secure a newer and more extended use in the agricultural regions of America and Europe during the past century. In recent years the agricultural experiment stations of the government and of many of the state colleges have given attention to gypsum fertilizer and have explained its good qualities in bulletins issued for the benefit of the public. Gypsum fertilizer manuring needs only an open statement of the favorable results obtained and described in numerous bulletins, books and scientific periodicals to secure new friends for it.

Varied Uses of Gysum Fertilizer

The particular uses of gypsum fertilizer which makes it of great value to the farmer who wishes to produce the best crops with the least cost, briefly enumerated, are:

Gypsum is an efficient fertilizer, furnishing sulphur and lime, both of which are essential plant foods.

Gypsum releases valuable plant foods which are abundant in most soils but which are insoluble and consequently not available as plant food until treated with gypsum.

Gypsum absorbs ammonia and holds it in barnyard manure until the compost is placed on the soil and is ready to be used by the plants as a food.

Gypsum deodorizes stables and renders them sanitary.

Gypsum supplies fertilizer to every crop and more especially to clover, alfalfa, grass crops, peas, beans, potatoes, corn, cotton and peanuts.

Gypsum forms an admirable mixture with Paris green to kill bugs on plants. Mixed with sulphur and other disinfectants gypsum forms a good duster for poultry. It is being used with arsenic compounds in a successful fight against the boll weevil.

Value of Gypsum as Fertilizer

Gypsum must be considered in three aspects and some care must be taken to distinguish between them.

1. AS A PRESERVATIVE—Gypsum is a preservative; that is, it is perhaps the only substance that can be success-

By H. H. Macdonald Secretary, Gypsum Industries Association, Chicago, Ill.



H. H. MACDONALD

H. H. MACDONALD

Mr. Macdonald is well known to men in the highway industries. For a number of years he was the right-hand assistant of Will P. Blair, secretary of the National Paving Brick Manufacturers' Association at Cleveland. Since January, 1918, he has been secretary of the Gypsum Industries Association at Chicago, where his work is attracting national attention. The accompanying article is an abstract of a very attractive booklet prepared for general distribution by the Gypsum Industries Association.

fully used in connection with farm yard manures which will preserve the full fertilizing value of these manures and at the same time add a direct fertilizing element.

2. MAKES POTASH AVAILABLE -Gypsum acts indirectly, by making available plant foods that are abundant in most soils but are not available in their normal form as plant foods. Most soils, clayey soils in particular, contain potash equal to the maximum agricultural requirements that may be placed upon the land for two to three hundred years, but this potash is in chemical combination with other things and is insoluble. Gypsum reacts on these insoluble potash compounds and renders limited quantities of this potash available year by year; in quantities sufficient to meet fully the requirements of organic life, but not sufficient to exhaust the soil as to its potash content for hundreds of vears.

3. CONTRIBUTES LIME AND SULPHUR-Gypsum, being hydrated lime sulphate, contributes both the elements of lime and of sulphur, which are essential plant foods.

Recent investigations have made it plain that sulphur is as important a plant food as are phosphate and potash. Not all soils, it is true, need to have any one of these three essential plant foods added to them. The farmer has to study his soil to determine whether it is worth while to pay the price required to supply phosphate or potash, and, with the same good judgment, he must determine the need of his soil for sulphur.

Formerly not sufficient importance was attached to the need of sulphur for plant growth. Recent analytical work. carried on primarily at the University of Wisconsin (Bulletin No. 14), has made it plain that earlier analyses of plants were defective, and that by the very process of analysis most of the sulphur was volatilized and only 10 per cent of the sulphur that is actually in the plant, leaf, stem and root, was found. This discovery has served to awaken agriculturists to the value of sulphur supply in soils and the necessity of maintaining

Field experiments carried out by Dr. P. J. O'Gara, Director of Department of Agricultural and Smelter By-Products Investigations, American Smelting and Refining Company, have shown in a very practical way the results that may be obtained by applying sulphur to the soil. An article by Dr. O'Gara in Manufacturers' Record for September 6, 1917, descriptive of his experiments, tabulates the effect on the various crops as follows:

INCREASE IN CROP YIELDS FROM TREATMENT WITH SULPHUR AND SULPHURIC ACID COMPARED WITH UNTREATED SOILS

			Percer	t Gain
Crop	Planted	Harvested	phur	Sul- phuric Acid treat- ment
Alfalfa	Apr. 20	8- 7-16	36.8	8.5
Barley		8- 7-16	52.6	8.6
Beets (sugar)		9-28-16	3.7	2.1
Corn		9-16-16	13.1	20.3
Kaffir corn		9-30-16	43.9	58.9
Millet		8-12-16	41.4	66.6
Milo maize		9-30-16	182.6	172.6
Oats		8-11-16	57.3	72.9
field)	Apr. 20	7-26-16	383.3	95.1
Potatoes Squash (Utah		10- 4-16	63.0	2.2
giant)	May 17	9-22-16	152.7	59.5
(Hubbard)	May 17	9-22-16	187.9	42.4
Sudan grass		9-30-16	23.9	18.1
Turnips		7-26-16	10.4	50.4
Wheat		8- 7-16	127.8	80.6

It was necessary for Dr. O'Gara, in his experiments, to change the sulphur and sulphuric acid to sulphate, which made them readily assimilated as plant food. This was accomplished by oxidizing bacteria.

Gypsum is already lime sulphate. It is not only the most available form of sulphur for agricultural purposes but is also the most economical means of supplying this essential plant element.

Preservative Values of Gypsum Fertilizer

One of the most important farm uses of Gypsum is in the preservation of stable manure. The power of gypsum to preserve the ammonia, which is a chemical compound composed of 82% nitrogen and 18% hydrogen, was known as early as the year 1800, and use was made of this agent to stop the losses, which were often considerable, of the valuable ammonium carbonate in the manure. Particularly essential ingredients of stable manure, which is so full of fertilizing substances, are the nitrogen compounds. A chief characteristic of nitrogen, which is a most important and productive plant food, is that it is always trying to escape. Gypsum holds the ammonia in the compost and fixes it until it is ready to be used by the plants when placed on the soil. While gypsum fertilizer prevents the loss of ammonia, it does not hinder the proper decomposition of the

In protecting the manure in the piles care must be taken to limit as much as possible the entrance of air into the interior of the piles so that the manure will not dry out. It should be protected from the sun and dry winds.

Not an ounce of the valuable nitrogen that is in the ammonia of the manure should be wasted, for artificial nitrates are now exceedingly scarce and almost prohibitive in price.

Gypsum Keeps Stables Cleanly

It is the aim of modern farmers to keep stables and surrounding premises in a sanitary condition. This is readily accomplished by sprinkling gypsum fertilizer liberally in the stall drains and upon the manure piles. Gypsum has a great affinity for ammonia and neutralizes the biting, penetrating odor. The effect that its use has on the health of the animals is marked, for it is claimed that when the air is kept free from strong ammonia fumes there is less tendency towards contraction of tuberculosis in the herds through weakening of membranes of the throat. The animals are also saved the annoyance of injury to the eyes from the ammonia fumes.

Rock Products

Two to four pounds a day of gypsum should be used for each animal if it is wished to preserve the valuable nitrates in the manure and also save the potash which is abundant in the liquor manure.

But one to two pounds of gypsum are necessary to be used for each animal to preserve the nitrogen alone. The conservation of the potash present in large amounts in the liquid manure is well worth the slight expense of using the extra amount of gypsum.

The manure thus treated should be kept under cover to prevent rain from washing away the valuable substances which the gypsum has saved.

Gypsum for Various Crops

In conclusion it may be said that gypsum is of especially direct benefit in the production of numerous crops such as clover and all legumes, including red clover, vetch, peas, beans, etc., and the crucifers, cabbage, rape, turnips and

Further, gypsum is recognized as a means for increasing the growth of potatoes. It has been noted in a striking way that potato land treated with gypsum produces larger potatoes and that the tubers are more free from scab. The plants remain green for a longer time and are more resistant to potato diseases. Authorities advise sprinkling the potato seed with gypsum just before planting.

Peanut growers generally rely on gypsum to save their crops in a dry season as it seems to draw needed moisture from the atmosphere.

"Land plaster (gypsum fertilizer) and burnt shells have produced peanuts of the production of numerous crops, such nitrate of soda have produced the poorest in this respect," the Virginia Agricultural Experiment Station, Bulletin No. 218 (January, 1918), says in part. "Land plaster (gypsum fertilizer) should be applies on the vines at the last working at the rate of two hundred to five hundred pounds per acre, depending on the growth of the vines, unless the land had been recently and sufficiently limed."

Gypsum, as already shown, supplies sulphur to plants in direct form and is, therefore, of the utmost value in wool production. "In one hundred pounds of crude wool there may be, approximately, two pounds of total sulphur. This considerable amount of sulphur necessary for building the sheep's fleece has raised the problem of the relative amounts and forms of this element in our common feeding materials and the efficiency of such forms for wool production," says, in part, Research Bulletin No. 14, University of Wisconsin Agricultural Experiment Station.

Large Beds of Tripoli Found in Miami (Fla.) Mining Field

WHILE it is generally known that the Miami (Okla.) mining field is the richest in the world in lead and zinc, it is not known that there are deposits of building material that is unexcelled, says the Industrial Record, (Dallas, Tex.)

This material is found in practically inexhaustible bodies and the tripoli beds contain material for building purposes that will almost supply the nation.

Oscar Lowry, of the Peoria Townsite Co., who has mailed samples to a Chicago contractor, says the contractor asserted that a material for stuccoing can be manufactured of it right here at the home of our tripoli, a material that is now being made in Chicago of California material and sent to this field to be used on our best buildings.

Tripoli is here in beds that cover thousands of acres several feet in depth and if it can be used as the Chicago man claims, we will be in a position to make the world come to us for their building material.

Road Building in 1919 To Cost Near Billion

ESTIMATES by the Bureau of Public Roads and Rural Engineering indicate a minimum expenditure on highways of \$300,000,000. Deferred construction and the improvement of existing roads so that greater use may be made of the parcel post system are expected to swell the total expenditures in the post-war period to \$1,000,000,000.

Definite estimates of amounts to be spent this year include the following: Maine, \$1,500,000; Rhode Island, \$90,000; Connecticut, \$4,000,000; New York, \$12,-000,000; New Hampshire, \$175,000; Kentucky, \$1,500,000; Alabama, \$1,000,000; West Virginia, \$16,000,000; Illinois, \$9,-000,000; Iowa, \$15,574,000; Louisiana, \$4,674,000; Texas, \$20,000,000; Nebraska, \$1,657,089.07; North Dakota, \$3,000,000; Wyoming, \$653,000; Colorado, \$3,900,000; California, \$20,000,000; Arizona, \$900,000; Nevada, \$1,148,849.80; Idaho, \$1,000,000.

Dallas to Raise \$500,000 to Build More Houses

DALLAS, TEXAS.—Houses are in such great demand in Dallas that the Dallas Chamber of Commerce has begun a campaign to raise \$500,000 for the purpose of erecting cottages and apartment houses. The urgency of the housing accommodations is due to the fact that for several months large numbers of oil operators have been pouring into the new oil regions of Central West Texas and the overflow is felt in Dallas, Fort Worth and other communities.

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Gravel Has a Place in War-Time French Road Building

Excerpts from Letters of Corp. Howard H. McDowell, 23rd Engineers, in France, to His Father, W. S. McDowell, Owner of the Okauchee Gravel Co., Oconomowoc, Wisconsin

FEBRUARY, 1918—"I have covered quite a bit of French territory since landing, as I have been stationed at three different base ports. At one of them I was attached to the 17th Engineers on railway work. The 17th is a railway regiment and is building the yards at this base. At present I am on detached service at one of the base ports on road work. I have a certain stretch of road to inspect, make reports on and see that it is kept in shape for traffic.

hauling. We are using the gravel to repair and widen the roads at this base, as they are subjected to very heavy traffic from our trucks, hauling supplies from the ships. It looks as though it will be an all summer's job and doesn't please me, as we are all anxious to get to the front where things are stirring."

American Progressiveness Crops Up

April 1st—"Still at the gravel pit with an interpreter. Government put up a shack for us and we are 'batching' it

U. S. Army road repair gang in France

We have so many heavy trucks over here that they wear large holes in the road and it keeps us constantly busy repairing them. In places we widen them by taking out the old material for a foot or so and using limestone rock about 6 to 12 in. in diameter as a base, then we cover that with crushed granite 2-in. size to fill the voids. When possible we cover this with a fine layer of gravel and it makes a very serviceable road. At present I am located at (censored), largest city in France, so you can make a guess where I am. If we had our gravel pit located here we could make a mint of money. I think from now on our work will be highway work, but we still pack our rifles and ammunition with us every move we make."

March 21st—"I am back in the gravel game again, being foreman of a pit we are working, using Spanish labor. I have 45 Spaniards shoveling the gravel into trucks and have from 5 to 15 trucks

and having a good time. We are moving about 100 yds. of gravel per day with 45 Spaniards shoveling into the trucks. Am going to put in a loading trap and work mules and slips."

April 14th—"We are now screening the gravel over a ¾-in. screen, too much clay in it for this wet weather. Now working mules and slips for loading."

June 16th—"We are repairing roads here (a few miles back of the front lines) in a primitive way that must have been common in the 16th century."

June 30th—"We are trying to repair some of these French roads after a fashion, but what the government wants is speed, so we are making a botch job out of it. In fact, we are short some of the necessary machinery and material to make a good job, so we are trying to do the best we can. We have a gasoline roller, a portable jaw crusher and a truck without a self-dumping body. A good deal of the \$3,000,000 equipment

that the 23rd were to have has been commandeered by other engineer units, so that leaves us short."

July 14th—"I have charge of a portable road crusher now. Seven men operate it and we have crushed as high as 30 cu. yds. per lay. They haul the rock out in blocks about 10 in. diameter with trucks and distribute where needed, and we move along with the crusher and a gasoline tractor to operate it and crush it. A new division just moved in here and if we have good luck we ought to finish the roads in this section in a month and we then hope we will move back to the front."

July 28th-"They are sure raising hwith the Boches now, but there is no chance for us mixing in it for at least six months, and probably not then, as we are busy repairing the roads and are now 60 miles back of the front and as soon as winter sets in I expect we will work in some quarry all winter and store up rock for spring work. As we have been over here six months, I have a gold chevron on my left arm. The Colonel turned down my request to enter the tank service as a gunner and I am out of luck. We crushed 486 cu. yds. of rock in the last 22 days, moving over about 5 miles of road."

August 20th—"We are doing well with the crusher now, averaging about 37 yds. per day and moving from ½ to ½ mile per day. I have 13 men now and work a new shift on each pile, average 2 yds., which keeps the boys fresh during the hot weather."

November 4th—"Have moved three times since I wrote last, and am now in a country full of rock. Am working colored boys now. Have seen the effect of bombs dropped from German planes and they certainly make a hole in the land-scape."

Decembebr 9th—"On November 22d, 14 of us were sent with a labor company of blacks up to this town of Pareid, which is about half way between Verdun and Metz."

This is from his most recent letter, and he writes that he has stopped guessing when he will be sent home.

Ray Appointed Secretary Iowa Sand Association

DES MOINES, IA.—Clifford V. Ray of the Capital City Sand Co., 308 Fifth street, Des Moines, has been appointed to fill the unexpired term of secretary and treasurer of the Iowa Sand & Gravel Producers' Association, caused by the death of W. R. Webster of Mason City. Mr. Ray is recognized as one of the energetic sand and gravel men of Iowa and his appointment meets general favor.

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Depletion Allowance for Stone Quarries, Sand and Gravel Pits

Any Relation Between Depletion and Stripping?—Depletion and Depreciation in the Talc Industry

Depletion and Stripping

THERE is perhaps no subject in connection with stone quarrying and crushing which furnishes a greater variety of arguments or a wider range of opinions as to value than that of the depletion allowance. One angle developed out of a recent discussion among a group of stone men in which difference of opinion was wide has to do with the relation of stripping to depletion value: whether a light and inexpensive burden of overhead stripping makes the quarry property worth more in the depletion allowance or not.

One man in the group argued that stripping was a direct cost item and therefore had nothing to do with depletion allowance. Another argued that while stripping might enter as cost it also had a bearing on the value of the quarry holdings and therefore became a factor in the matter of depletion charge. And then there was a split on this point until it all became so complex and entangling as to be brain racking. One argument was that a heavy stripping should increase the depletion allowance while opposed to this was the argument that the lighter the stripping burden the more valuable the quarry property, consequently the larger should be the allowance for depletion.

Of course it all finally gets back to the original value or cost of the acreage. Primarily a man establishing a quarry would, all other things being equal, presumably pay more for property where the stripping is light than where heavy. On the other hand, the man buying where the stripping burden is heavy might well add something of the estimated cost of this to the original purchase price, so that in the final analyses it would all balance up. So here we have two apparently contradictory lines of argument which really prove up to the same end.

Depletion allowance and stripping cost are both items which are properly coming in for more thoughtful consideration than formerly, and pro and con arguments about them, if conducted in the right spirit, should lead to enlightenment that will prove useful all around. J. Crow Taylor.

Depletion and Depreciation in Talc Industry

IR—I have been following with interest the various articles relating to Depletion and Depreciation," as writ-

ten by crushed-rock producers. The tale industry is so similiar in many respects to the cement and rock industries that I feel our problems are alike. It is certain that a manufacturer who neglects to protect his future by properly depleting his deposit, as well as by depreciating his buildings and equipment, is headed toward financial embarrassment. When liquidation ultimately takes place, it is noticed that paper profits do not pay off liabilities.

Our company operates two different tale deposits—one located directly on the railroad and the other 3½ miles distant. In figuring depletion, we charge off 15 cents per ton, having arrived at this amount by dividing the book value of our mineral resources by the establishment tonnage we are absolutely certain these resources contain. By so doing, the book value is gradually wiped off and when our established tonnage has been removed, the balance of our mineral deposits stand us nothing.

On the other hand, it is manifestly unfair to ourselves, as well as to competitors who are not so advantageously located on the railroad, to deplete our railroad deposit only 15 cents per ton when we pay a hauling charge of \$1 per ton from the other mine, unless we include a fictitious cost of \$1 per ton in the operating expenses of the mine on the railroad.

Depreciation

The question of depreciation is of especial interest and primarily should be based on the life of the mineral deposit. If, for example, a deposit is being operated, the life of which is only five years, the mill and equipment must be depreciated approximately 30 per cent annually in order to realize the book value at final liquidation. I believe that a plant of the rockcrushing type is fortunate to average better than 16 per cent on the entire original cost after five years of wear and tear. This is due to the style of construction, the usual inability to put the buildings to any other use, the slight demand for used equipment of this type under ordinary conditions. An annual 30 per cent depreciation for five years approximates 16 per cent of the original value.

On the other hand, if a deposit is known to have a much longer life, the property should be depreciated in accordance with the estimated life of buildings and equipment and even then, depreciation should be conservative enough to allow for the occasional replacing of a machine not worn out, but incapacitated by an improved type

which may render the former equipment obsolete, as far as economical operation is concerned.

In the tale business, we consider 20 per cent a reasonable figure for depreciating mining equipment and buildings, operated 10 hours per day. Milling equipment is reduced 20 per cent on a 22-hour day basis and mill buildings 15 per cent. Owing to the fact that "trap rock" is an unknown quantity in this locality, a depreciation of 33½ per cent is absolutely necessary on automobile trucks, due to local road conditions. Repairs and renewals to any of the above items are, of course, charged as an operating expense.

Not having noticed any specific figures covering depreciation, I shall be glad to hear the viewpoints along these lines.

H. N. Gordon, Treasurer.

American Mineral Co.

Potash Problem Solved

AN Associated Press dispatch from Paris under date of December 30, states that "Edward N. Hurley, chairman of the American Shipping Board, has devised an important scheme for utilizing the vast amount of American tonnage now returning to the United States in ballast for supplying this country with the huge stock of potash needed for agricultural purposes.

"Mr. Hurley explained briefly that at present Italy, France and England were taking from America food and war supplies requiring a million and a half tons of shipping, which was virtually all returning to the United States in ballast. It was now proposed to substitute cargoes for the ballast, beginning with potash from the extensive deposits of Alsace under French control.

It is quite clear now why fertilizer manufacturers are not encouraging home producers of potash.

According to later advices Senator Hitchcock learned the other day that decision has been reached by the French government that all of the potash production of Alsace will be used for several years in aiding the restoration of northern France and Belgium. By the time it is possible for the Alsatians to begin exports of potash it is expected the American potash industry will have been established on such a stable basis.



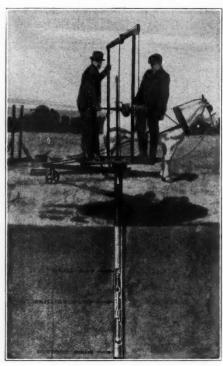
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Drill for Testing Sand and Gravel Deposits

A TYPE OF DRILL much used in the gold fields for testing gravel deposits for gold is described in a new publication of the Bureau of Mines on "Gold Dredging in the United States." Probably the same simple apparatus could be used to advantage in exploring sand and gravel deposits for the commercial possibilities of the material.

The device is known as the Empire and is described as follows: Briefly, the



Drill for testing sand and gravel deposits

drill consists of a pipe, a platform, the rotating and driving devices, and the boring, drilling, pumping, and pulling tools. The operation is as follows:

The pipe, having a toothed cutting shoe on the bottom and a platform on the top, is placed in an erect position at the spot where the sample is to be taken. Where practicable, a small auger the size of the casing is generally used to start the hole. The material removed by the auger is washed with the rest. Some of the crew steady the pipe and others stand on the platform and with a battering ram drive the pipe into the ground until it will stand without help.

The rotating device is then attached and a combination drilling and pumping tool screwed to the rods is used as a

churn drill, the pipe being rotated simultaneously. While it is thus kept loose in the ground, it is sunk (1) by the weight of the pipe, (2) by the weight of the platform attached to the top of the pipe, (3) by the weight of the drill men who stand on the platform, (4) by the weight of the rod and tools that the drill men operate while standing on the platform (5) by the jarring effect of the tool striking on the bottom of the hole. As the pipe sinks into the ground a core accumulates, and the churning crushes this core and forces it into the pump. Despite the contention of manufacturers. the hand drill usually requires more than rotation and weight to sink it and driving with a battering ram will almost always be necessary.

Quarry Stripping Machine

STRIPPING DEVICE employed at the quarry of an Ohio cement plant is described in "Rock Quarrying for Cement Manufacture" by Oliver Bowles, U. S. Bureau of Mines Bulletin 160. The accompanying illustration shows the device which operation is described as follows: The soil to be removed is 30 to 45 ft thick, and the bed of rock beneath is only 8 ft. thick. With the low efficiency of stripping observed in some localities, profitable quarrying under such conditions would be almost impossible. As the rock is removed, the area worked out is available for disposal of overburden. The equipment, as shown, consists of an inclined bridgelike structure of steel mounted on wheels. On this incline, two independent cable cars on separate tracks are operated with an electric hoist. The cars are loaded with the steam shovel, hauled up the incline, and

dumped. The total length of the conveyor is 175 ft. and it places the material 150 ft. from the steam shovel. The shovel has a 2½-yd. dipper, and each car is of 5-yd. capacity. The whole machine may be moved forward as the shovel is advanced. The company claims that stripping can be done by this method at an actual working cost of 2 cts. a cu. yd., not including overhead charges, depreciation, or interest on the investment, and that with a gang of 9



Smallest practical quarry shovel

men 2,000 yds. can be handled per day. The equipment is well adapted for stripping back into pits from which all serviceable stone has been removed.

Smallest Practical Quarry Shovel

WHAT is claimed to be the smallest steam shovel for operation in a quarry or gravel pit is the ½-yd. "A" model Erie, made by the Ball Engine Co., Erie, Pa., illustrated herewith. This shovel weighs only 13 tons, but is claimed to have power enough to dig cemented gravel, stiff clays and lighter shales, without blasting.



Stripping machine used by Ohio cement company in quarry

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Incentives to Building Program Multiply

Loans for Construction Work Freer—U. S. Labor Department Pushing Public and Private Programs—Prices Cut on Cement in New York, and Other Material Held Down and Stabilized Against a Tendency to Rise

NEW YORK—Restraint heretofore felt by mortgage interests and lending institutions in the matter of freely making loans on building operations has been officially removed, according to The Dow Service Daily Building Reports.

Felix Frankfuter, assistant to William B. Wilson, Secretary of the Department of Labor, has formally declared that the Federal Reserve Board and all affiliated Government authorities are now bending every effort to encourage building construction, including the flotation of loans on private and public construction projects.

Secretary Glass of the Treasury Department strangled at once the general idea that the banks, trust companies, savings institutions and lending interests of various sorts would be the primary source of flotation of the next Liberty loan, by stating that the public will be just as ready patriotically to absorb that loan as it was to subscribe to the others. This was the first factor that put the lending interests at ease. Supplementing this statement was one from the Assistant Secretary of the Department of Labor, which said:

"As far as the Department of Labor is concerned, we are making every effort to stimulate the development of necessary public works by the states and cities during 1919. We shall shortly know the programs of 500 cities. can already estimate that the amount of public work will be valued well above the normal amount of \$600,000,000 per annum, and we have every confidence that both public and private work will go forward in large volume. Furthermore it is the definite policy of the Government, as announced in the President's message and as followed by all Departments, to set in motion all the necessary public work in order to supply some substitute for the large Government orders which have been cancelled. On behalf of the Secretary of Labor hope you will bring home to the building trade his desire to assist it in any way in his power and that the industry will feel able to do its part in providing employment for large numbers of returning soldiers and former war workers in 1919." Stabilizing Prices

As an evidence of the disposition of the building interests to do its part, the building material distributors of New York on Saturday voluntarily cut the price of Portland cement 20 cents a barrel, delivered on the job, although no cut whatever was made in wholesale quotations. The hydrated lime manu-

facturers advanced the price of their commodity a dollar a ton, but, in line with the general determination to keep the building material market stable, no change has been made, nor is likely to be made, in the delivered price of this commodity. Common brick interests have resolutely determined to keep the wholesale price at the present \$15 level despite pressure from some quarters to advance prices. The largest producers of Pennsylvania roofing slate have adopted a new price stabilizing basis.

Other building material stabilizing movements last week were a recasting of concrete bar prices so that specifications for any favorable quantity could be closed at \$2.70 to \$2.75. Portland cement delivered at job, Manhattan, Bronx, Brooklyn or Queens was cut by dealers from \$4 a barrel to \$3.80, and

desirable rubber covered wire is now obtainable at lower levels. Changes have been made in pipe discounts in favor of the consumer.

The Portland cement industry shows the first reflection of this unprecedented turnabout in construction economics, which has been as unexpected to the trade as it is to the consumer. In the midst of winter, the fifteen day shipment out of the Lehigh Valley district, shows only a 4 per cent difference under that of the same period last year, with some companies showing a very great individual gain in actual sales, amounting in some cases to almost double the business taken during war time a year ago, thus indicating, with the decided improvement in common brick inquiry that a change for the better is under

U. S. Perfects Plans for Disposing of Surplus Machinery and Supplies

Government Using Up Its Building Material Surplus

WASHINGTON, D. C.—Plans for the disposition of the stocks of surplus construction materials, machinery, etc., now in the possession of the Government, have been perfected by the War Department, according to C. W. Hare, director of sales.

Inventories made for the purpose of affording an idea of what would be dumped on the market should it be decided to sell at public auction, show that the Government has 14,516,000 brick, 115,523 barrels of cement, 77,560 barrels of lime, and large quantities of other building materials.

It has been announced that tentative plans for the sale of machinery and tools have been arranged which are highly satisfactory to the trade. Under these plans, manufacturers in the trade will be given an opportunity to purchase these machines and tools at an agreed price before they are offered to the general public.

This plan will probably be followed out in disposing of the cement, lime and other materials, and it is expected that prices will be fixed at such a level as to assure very little of the material being offered to the general public WASHINGTON, D. C.—The stabilization of conditions in the building trades was considered at a meeting held recently at the Council of National Defense Building, between representatives of the several construction bureaus of the Government, the War Industries Board, and producers of building materials.

The conference was called for the purpose of developing a uniform method of procedure for the several Government agencies in the matter of the disposal of surplus stocks of building materials. It was declared that these surplus stocks are being absorbed by redistribution among the several Government departments so that the greater portion of them will be cared for.

Manufacturers present appeared much surprised at the small stocks of surplus materials in the possession of the Government. It was agreed that the proposed method of disposing of these supplies would remove an uncertainty that was seriously and adversely affecting not only the market for building materials, but the building industry itself.

Representatives were present representing cement, lime and gypsum.



Agricultural Limestone Wholesale at Plant, per Ton

EASTERN:

Cambria, N. Y.—(All thru 15 mesh) Analysis, CaCo₃, 93.94%; MgCo₃, 4.24% 2.00

Hillsville, Pa.—(90% thru 100 mesh) in 80 lb, ppr. bags, \$4.50; bulk....... 2.75

West Stockbridge, Mass.—(50% thru 100) Analysis, CaCo₃, 96%; MgCo₃, 2%; ppr., \$4.50; bulk.....

CENTRAL:

Alton, Ill.—(Pulv. and 90% thru 50 mesh; 90% thru 4 mesh) Analysis, CaCo₃, 96%; MgCo₃, 75%..... 2.00 Bedford, Ind.—(90% thru 10 mesh) Analysis, CaCe₃, 98.5%; MgCo₃, 0.5%

2.75

Columbia, Ill., near East St. Louis
—(1/4" down) 1.00 1.75

2.00 MgCo₃

Marble Cliff, O.—(50% thru 100 mesh)

Analysis, CaCo₃, 86%; MgCo₃, 8%...

Marblehead, O.—(50% thru 100 mesh;
60% thru 50 mesh; 100% thru 10

mesh)—Analysis (Min.), CaCo₃,
32.03%; MgCo₃, 3.75%. Bulk, \$3.00;
ppr. 80 lb. sack... 3.00

McCook, Ill.—(90% thru 4 mesh)...... .75@1.00 1.50 Milltown, Ind.—Analysis, CaCoa, 98%

Rockford, Ill. — Analysis, CaCo₃, 53.75%; MgCo₈, 44.35%.....

Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru 1/8" mesh) Analysis, CaCo₈, 89.61 to 89.91%; MgCo₈, 3.82% 1.50 MgCo₃, 3.28 / m 100 mesh)

Whitehill, Ill. — Analysis, CaCo₃, 96.12%; MgCo₃, 2.50 / m 20 mesh, bars.

90 / m thru 100 mesh, bars.

90 / m thru 50 mesh, bulk. .50

SOUTHERN:

Brooksville, Fla. - Pulverized lime-1.80 3.50

(Continued on next page.)

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Screenings,

Crushed Limestone

City or shipping point	1/4 inch	1/2 inch	3/4 inch	11/2 inch	21/2 inch	3 inch
EASTERN:	down	and less	and less	and less		and larger
Auburn and Syracuse N V	.80	1.20	1.20	1.20	1,20	1,20
Auburn and Syracuse, N. Y Buffalo, N. Y	.00		all sizes from s		1,20	1.20
Burlington, Vt.		,	2.50	2.00	1.75	
Coldwater, nr. Rochester, N. Y.		***************************************	Flux, 1.50@			ocal)
Grove, Md.	***************************************	*************	2.25	2.05	1.65	1.50
Grove, Md. Hagerstown, Md. Hull, Canada		\$2.00 for a	ll sizes			
Hull, Canada	1.20	1.20	1.20	1.05	.80	*************
North Leroy and Akron, N. Y	\$1.00 for a	all sizes, incl	uding R. R. ba	llast		
Walford, Pa	1.25	1.50	1.50	1.50	1.50	1.50
CENTRAL:						
Alden, Ia.	.20		1.00	1.00		
Alton, Ill.	1.85		1.45	1.35		
Chicago District	.80	1.00	.80	.80	.80	.80
Columbia, Ill. (near E. St. L.)			.95@1.30	.95@1.30	.80@1.20	***************************************
Detroit, Mich	Vari		50 per net ton	6		***************************************
Dundas, Ont.	.65	1.10	1.10	1.10	.90	.90
Eden and Knowles, Wis	.80	.80	4489994444444	1.00	1.00	1.00
Ft. Wayne, Ind	Varie		60 per net ton			
Illinois, Southern	1.50	1.50	1.50	1.50	1.25	1.25
Greencastle, Ind	.90@1.25	1,10	1.00	.90	.90	.90
Lannon, Wis.				1.10 all siz	es	
Lewisburg, O	1.00	*************	1.10	1.00	1.00	1.00
Lima, Ohio	1.00			1.10 all siz		
Linwood, Scott Co., Ia	.50	**********	1.13	1.05	1.13	4-44-4
Mankato, Minn,	***************	**************	************	1,25	1.00	**************
Mayville, Wis	.75	.75	.75	1.10	1.10	1.10
McCook, Ill.	1.00@1.25	1.50@1.65	.90@1.10	.70@ .90	.70@ .85	.70@ .85
Montrose, Ia Oshkosh, Wis	*************	1.10@1.20	1.10@1.20	1.00@1.10	1.00@1.10	1.25@1.35\$
Oshkosh, Wis		1.00	in all sizes, Blu	e Limeston	e	
Ottawa, Can		2.00	2.00	1.75	1.50	
River Rouge, Mich	.80@1.00	1.25	1.25	1.25	1.25	1.25
Rockford, Ill.	1.25	************		1.25	1.25	1.25
Sheboygan, Wis			.80@1.00 for			
Sherman and Hamilton, Wis	50	111.	All sizes \$1.00		1.00	
Stone City, Ia		(1-inch		1.10	1.00	
Toledo, Ohio		1.80	1.80	1.80	1.70	
Toronto, Can	.65	1.10	1.10	1.10	.90	.90
SOUTHERN:						
Brookville, Fla.	000040404040400000000000000000000000000	***************	************	2.50		
Cartersville, Ga	*************************	2.40	2.30	2.30	2.20	
Cartersville, Ga. Fort Springs, W. Va	1.00	1.00	1.60	1.40		*************
			way ballast 1.1			
Irvington, Ky	.75	*************		.90		****************
Mascot, Tenn.		1.00	*******			************
Stephensburg, Ky			1.20 any		4 00	1.00
Winnfield, La	1.20	1.80	1.80	1.80	1.80	1.80
WESTERN:						
Atchison, Kans	.50	1.50	1.50	1.50	1.40	1.40
			Rip-Rap @		-	
Carthage, Mo	1.50	1.50	1.25	1.25	1.25	1.25
El Paso, Tex			.90 for all :			
Kansas City, Mo		1.35	1.35	1.35	1.35	1.35
•						

Crushed Trap Rock

1.35

	OT CHOTT		7 7 7 7 7 7 7			
	Screenings,	_				
	1/4 inch	1/2 inch	3/4 inch	11/2 inch	2½ inch	3 inch
City or shipping point	down	and less	and less	and less	and less	and larger
Baltimore, Md. (vicinity)	1.25	3.15	2.75	2.50	2.40	************
Birdsboro, Pa.	1.25	1.80	1.70	1.50	1.50	1.25
Duluth, Minn.—Trap	.65@ .75	1.35@1.50	1.25@1.35	1.15@1.25	1.15@1.25	***************************************
Glen Mills and Rock Hill, Pa.	1.10	1.40	1.80	1.60	1.60	1.40
—Trap		R. R. bal	last 1.40			
Little Rock, Ark,-Trap	0940008083880000000	1.75		1.75	1.50	1.35a
Millington, N. J.	1.75	1.85	1.75	1.75	1.60	*************
Montrose, Ia.—Trap	***************************************	1.10@1.20	1.10@1.25	1.05@1.10	1.00@1.10	***************************************
Morristown, N. JTrap	1.85	1.75	1.75	1.60	1.40	1.40
New Britain, Conn	.75	1.30	1.25	1.20	1.00	***************************************
North Brandford, ConnTrap	.80	1.30	1.25	1.20	1.10	*************
Richmond, Cal.—Trap	0======================================	************	1.75	1.65	1.65	************
Westfield, MassTrap	.60	1.00	1.10	1.00	.90	**********

Miscellaneous Crushed Stone

City or shipping point	¼ inch	½ inch and less	34 inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Fair Oaks, CalifCr. Bldrs		1.05	.95	.85 1.25	1.00	1.00
Hendlers, Pa.—Quartzite Little Falls, N. Y.—Syenite	60	1.00 Otl	1.35 her sizes 1.00,	including R	R. ballast	
Richmond, Va. (Quarry)	1.00@1.75	1.40@1.75	1.40@1.75	1.40@1.75	1.40@1.75	1.40
Stephensburg, Ky Stockridge, Ga.—Granite		1.26 per cu. 2.50	yd. any size 2.50	2.25	2.25	2.00
Toledo, O.—Slag	.75@1.25	.85@1.40	.85@1.40	.85@1.40	.85@1.25	.85@1.25
*Cubic yard, †Agrl.	lime. K. K.	ballast.	rlux. TRip-r	ap. a 3-inc	n and less.	

1919

nch

1.50

1.50

.80

.90 1.00

1.00

1.10 .85 35‡

.10

.80 .40 .25

er 25

5a 40

Agricultural Limestone Wholesale at Plant, per Ton

(Continued from preceding pag	e.)
Keystone, Ala.—(90% thru 50 mesh) Analysis, CaCo ₃ , 99.50%; MgCo ₃ , none	1.25
Mascot, Tenn.—Analysis, CaCo ₈ , 52%;	
(90% thru 100 mesh)	
Stephensburg, Ky.—Analysis, CaCo ₃ ,	1.00@1.50
Winnfield, La.—(50% thru 50 mesh)	
WESTERN:	
Cement, Cal.—Analysis, CaCo ₃ , 95%; MgCo ₃ , 1% (50% thru 100 mesh)	4.00@5.00
Elsberry, Mo.—(Pulverized) Analysis, CaCo ₃ , 99.29%	1.85@1.95
Fresno, Cal.—(All thru 40 mesh) Analysis, CaCo ₃ , 98%; MgCo ₃ , 1%. (50% and 40% thru 200 mesh) sacked, \$5.50; bulk, \$5.00. (100% thru 40 mesh) sacked, \$5.25; bulk	4.75
Kansas City, Mo.—(50% thru 100	4.73
mesh)	1.50

Miscellaneous Sands per Ton at Plant

Silica sand is quoted washed, dried and screened, unless otherwise stated.

GLASS SAND:	
Berkeley Springs, W. VaGlass	2.50@3.00
Bowmanstown, PaGlass sand	2.50
Cedarville, N. JGlass	
Hellam, Pa.—Glass	
Dundee, Ohio-Glass	
Gray's Summit, MoGlass	
Kermit, VaGlass sand:	
Washed	2.25@2.75
No. 2	1.75@2.00
Mapleton, Pa.—Glass, damp	3.50
Massillon, Ohio-Glass	
Michigan City, Ind Glass sand	.30
Millington, Ill.—Glass	
Mineral Ridge, OGlass	1.75@2.75
Montreal, Can,-Glass	
Montoursville, PaGlass	1.25@2.00
Oregon and Wedron, Ill.—Glass	
Ottawa, Ill.—Glass:	
Large contracts	1.75@2.00
All others	2.00@2.50
Sands, Elk Co., Pa.—Glass sand: Washed, wet	2.50
Selected, green	2.50
Silica and Pacific, MoGlass	2.00@2.50
St. Mary's, PaGlass sand-Green	2.50@3.00
South Vineland and Cedarville, N. J	
Glass	2.00
Sugar Grove, Ohio-Glass	
Thayer, W. Va.—Glass	2.75
FOUNDRY SAND:	
Albany District, N. Y Molding	2.00
Allentown, PaMoulding	1.40@1.50
Bowmanstown, PaMolding	
Cleveland, OMoulding	
Cleveland, OCore, at pit	.33@ .75

Sugar Grove, Ohio-Glass	2.00@2.25	
Thayer, W. Va.—Glass	2.75	
FOUNDRY SAND:		
Albany District, N. Y Molding	2.00	
Allentown, PaMoulding	1.40@1.50	
Bowmanstown, PaMolding	1.50	
Cleveland, O Moulding	1.25@1.75	
Cleveland, OCore, at pit	.33@ .75	
Columbus, OMolding	1.50@2.00	
Fleetwood, PaSilica heating	2.15	
Kansas City, MoCore	1.00	
Hellam, PaMolding	2.00	
Montreal, CanMolding	2.75@3.25	
Mapleton, Pa.—Molding, damp Molding, dry	3.00 3.50	
Michigan City, Ind.—Core	.40	
Millington, IllCore, damp	1.50	
New Lexington, Stamden and Layland, Ohio-Moulding	2.00@2.25	
Ohio-Various points:		
Fine molding	2.00@2.25	
Shipments between Nov. 1 and April 1, 75c per ton added.	1.75@2.00	
Ottawa, IllSand blast sand	2.50@2.75	
Ottawa, IllMolding	.65@1.00	
Utica, IllMolding.		
Wedron, IllMolding	.75@1.00	
West Albany, N. YMolding		
Zanesville, O Moulding	2.00@2.25	
April 1, 75c per ton added. Ottawa, III.—Sand blast sand Ottawa, III.—Molding Utica, III.—Molding Wedron, III.—Molding West Albany, N. Y.—Molding	2.50@2.75 .65@1.00 .75@1.00 .75@1.00 2.25@5.00	

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

		Duria c	and Gra	A CI		
City or shipping point EASTERN: Sowmanstown, Pa.	Fine Sand 1/10 inch down	Sand, 1/4 inch and less	Gravel, 1/2 inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
Sownanstown, Pa. Suffalo, N. Y. Suffalo, N. Y. (Niagara River) Libby's Pit, Leed's Junct., Me. Aorristown, N. J. (from stgc.) No. Wilbraham, Mass. Hitsburgh, and McKeesport, Pa. Vashington, D. C. CENTRAL: Ligonomia, Ill	*************	1.20	1.10	all sizes	***************************************	
Buffalo, N. Y. (Niagara River)	1.00	.85	.80	., an sizes	.80	.8
libby's Pit, Leed's Junct., Me.	1.00@1.15	.50@ .75	1.50	1.45	1.35	1.2
Morristown, N. J. (from stge.)	.70	.70	1.20	1.20	1.20	1.2
lo. Wilbraham, Mass	***************	.50*	1.75*	***************************************	1.20*	1.0
ittsburgh, and McKeesport, Pa.		1.25@1.50	************************		1.05	1.0
Vashington, D. C.	.75	.75	2.00	1.70	1.40	1.2
CENTRAL.	***********	.75	2.00	1.40	1.20	1.2
Igonouin III		A 11	.d. = 50 p. = 0		the \	
Algonquin, III. Barton, Wis. Beloit, Wis. Cincinnati, Ohio Columbus, Ohio Columbus, Ohio	75	70				
Beloit, Wis.	.40	.40	1.00	.40	.40	.7
hicago, Ill.	. 10	.95@1.05	.50	.10	.95@1.05	
Cincinnati, Ohio	.40@ .50	.40@ .50	.40@ .50	.50@ .60	.50@ .60	.50@ .6
olumbus, Ohio		.60	.50	.60	.60	.6
Des Moines, Ia	.50	.50	1.50	1.50	1.25	1.2
lgin, Ill.	***************************************	.50	.50	.50	.50	.5
scanaba, Mich	1.00	1.00	1.20	1.20	1.00	1.0
ort Dodge, Ia	*********	1.10	.50 .40@ .50 .50 1.50 .50 1.20 1.75	0101		1.7
lawarden, Ia.	.40@ .60	.40@ .60	************	.95@1.25.	**********	.85@1.0
reenville and Mechanicsburg,						
Ohio	.50	.50	.60	.60	.60	.6
llinois, Northern	.60@ .70	.60@ .70	.70@ .80	.60@ .70	.60@ .70	.50@ .0
ndianapolis, Ind	.50	.50	**************	.05	.05	.0
anesville, wis,	FO @ 60	.50@ .75 .50@ .60	.70@ .80 .50@ .70 1.10@1.20	(0.0) 90	.50@ ./5	600 9
Incom City In	.50 @ .60	.50@ .60	1 10 @ 1 20	.00@ .80	1.00@ 1.00	1.00@1.2
olumbus, Ohio bees Moines, Ia	.00	Pail.		d road work	40	II.2
ilford, Ind.		60	way ballast an	TORU WOIK	.70	
lilford, Indlilwaukee, Wislinneapolis, Minn.	1.06 f	or all sizes	1.25* 2600 lbs75@ .85 .60@ .85 1.00 1.85 1.75* .85	3		
linneapolis, Minn,	.50*	.50*	1.25*	1.20*	1.15*	1.1
,,	2800 lbs.	2800 lbs.	2600 lbs.	2600 lbs.	2600 lbs.	2600 1
Iontezuma, Covington, Ind	.75	.75	.75@ .85	.75	.75	
iles, Mich,	************	.50@ .80	.60@ .85	.50@ .80	.50@ .80	.50@ .8
abula, Ia	.40@ .60	.40@ .60	1.00	1.00	1.00	1.0
aginaw, Mich	.95	.95	1.85	1.85	1.60	1.0
. Paul, Minn	.65*	.65*	1.75*	1.25	1.15*	1.1
erre Haute, Ind	.75	.75	.85	.75	.75	-6
fontezuma, Covington, Indiles, Mich		~~	All sizes	5, .75.		0
inona Lake, Ind	(0.6)	./5	1.00.601.40	1 00 @ 1 40	05@125	05@12
				1.00 @ 1.40	.93 W 1.23	.55 (6 1.4
barlaston W Va (Piner)		1 20 @ 1 20	1 30	1 30	1 30	1.3
SOUTHERN: harleston, W. Va, (River) ake Weir, Fla ackson and Roseland, La noxville, Tenn elzer, S. C alde Rouge, La Vaco, Tex WESTERN:	FO	1.20@1.30	1.30	1.30	1.50	2.0
okeon and Doseland I a	.50	.50	1.00	1.00	1.00	
newville Tenn	95@ 00	95@ 00	1.00@1.50	1 00@150	95@1.40	95@1.4
elzer S C	.03 @ .50	.03 @ .90	1.00@1.30	1.00 @ 1.50	. 25 (4 1.40	
alde Pouge I a	,33	1.00*	2 25*	2.10*	1 75@2.00*	
Jaco Tex	75	75	1.20	1.20	1.00	1.0
WESTERN.	.,,	./3	1,20	1,00		
polin Mo	1.00	60	.45	1.50	1.25	2.0
ansas City. Mo	C	ar lots, buil-	ding sand, @	0 .60: retail	truck 1.50*	
incoln, Neb.—(Pit)	.55	.55	1.50	1.50	1.50	1.4
iles Calif	.60	.50@ .70	.50@ .70	.50@ .70	.50@ .70	.50@ .7
IICS, Callin						
maha, Neb.	.60	.60		*************	***************************************	************
maha, Nebueblo, Colo	.60 .80	.60 .75	***************************************		1.75	000000000000000000000000000000000000000
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal	.60 .80	.60 .75	.35 River sai	nd ¼ inch	1.75	1 25 61 3
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal	.60 .80 1.20@1.35	.60 .75 1.20@1.25	.35 River sar 1.50@1.75	nd ¼ inch 1.30@1.40	1.75 1.25@1.40	1.25@1.3
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal t. Louis, Mo. an Francisco, Cal	.60 .80 1.20@1.35	.60 .75 1.20@1.25	.35 River san 1.50@1.75 15 for all gra	nd ¼ inch 1.30@1.40 ades gravel.	1.75 1.25@1.40	1.25@1.3
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal Louis, Mo. un Francisco, Cal attle, Wash.	.60 .80 1.20@1.35 1.25*	.60 .75 1.20@1.25 1.25*	.35 River sar 1.50@1.75 15 for all gr 2.00*	nd ¼ inch 1.30@1.40 ades gravel. 1.25*	1.75 1.25@1.40 1.25*	1.25@1.3
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal Louis, Mo an Francisco, Cal azttle, Wash. ancouver, B. C. (Scows)	1.20@1.35 1.25*	.60 .75 1.20@1.25 1.25* 1.45*	.35 River sai 1.50@1.75 15 for all gr: 2.00* 1.70*	nd ¼ inch 1.30@1.40 ades gravel. 1.25* 1.65*	1.75 1.25@1.40 1.25* 1.65*	1.25@1.3 1.2 1.4
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal t. Louis, Mo an Francisco, Cal eattle, Wash. ancouver, B. C. (Scows)	1.20@1.35 1.25*	.60 .75 1.20@1.25 1.25* 1.45* 1.45*	.35 River sai 1.50@1.75 15 for all gr: 2.00* 1.70* and Gr	nd ¼ inch 1.30@1.40 ades gravel. 1.25* 1.65*	1.75 1.25@1.40 1.25* 1.65*	1.25@1.3 1.2 1.4
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal t. Louis, Mo an Francisco, Cal eattle, Wash. ancouver, B. C. (Scows)	1.20@1.35 1.25* ink Rur	1.20@1.25 1.25* 1.45* 1.45*	.35 River sai 1.50@1.75 15 for all gr: 2.00* 1.70* and Gr	nd ¼ inch 1.30@1.40 ades gravel. 1.25* 1.65*	1.75 1.25@1.40 1.25* 1.65*	1.25@1.3 1.2 1.4
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal Louis, Mo an Francisco, Cal eattle, Wash. ancouver, B. C. (Scows) Ba	1.20@1.35 1.25* nk Rur Fine Sand	1.20@1.25 1.25* 1.45* 1.45* 1.45*	35 River sai 1.50@1.75 15 for all gr: 2.00* 1.70* and Gravel,	nd ¼ inch 1.30@1.40 ades gravel. 1.25* 1.65* avel Gravel,	1.75 1.25@1.40 1.25* 1.65* Gravel,	1.25@1.3 1.2 1.4 Gravel,
maha, Neb. ueblo, Colo. coche Spur, Tulare Co., Cal Louis, Mo. an Francisco, Cal eattle, Wash. ancouver, B. C. (Scows) Ba City or shipping point	1.20@1.35 1.25* nk Rur Fine Sand 1/10 inch	1.20@1.25 1.25* 1.45* 1 Sand Sand, ¼ inch	35 River sar 1.50@1.75 15 for all gr: 2.00* 1.70* and Gr Gravel, ½ inch	nd ¼ inch 1.30@1.40 ades gravel. 1.25* 1.65* avel Gravel, 1 inch and less	1.75 1.25@1.40 1.25* 1.65* Gravel, 1½ inch	1.25@1.3 1.2 1.4 Gravel, 2 inch and less
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal Louis, Mo n Francisco, Cal arttle, Wash. ancouver, B. C. (Scows) Ba City or shipping point EASTERN:	1.20@1.35 1.25* ink Rur Fine Sand 1/10 inch down	.60 .75 1.20@1.25 1.1.25* 1.45* 1 Sand , Sand, ¼ inch and less	35 River sai 1.50@1.75 15 for all gr. 2.00* 1.70* and Gr Gravel, ½ inch and less	nd ¾ inch 1.30@1.40 ades gravel. 1.25* 1.65* avel Gravel, 1 inch and less	1.75 1.25 @ 1.40 1.25* 1.65* Gravel, 1½ inch and less 60	1.25@1.3 1.2 1.4 Gravel, 2 inch and less
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal Louis, Mo an Francisco, Cal arttle, Wash. ancouver, B. C. (Scows) Ba City or shipping point EASTERN: ttica, N. Y. onville, N. Y.	1.20@1.35 1.25* Ink Rur Fine Sand 1/10 inch down .50 .45@.60	.60 .75 1.20@1.25 1.25* 1.45* 1 Sand X inch and less .50 .40@.60	35 River sai 1.50@1.75 15 for all gr: 2.00* 1.70* and Gr Gravel, ½ inch and less .60	nd ¼ inch 1.30@1.40 ades gravel. 1.25* 1.65* avel Gravel, 1 inch and less .60	1.75 1.25@1.40 1.25* 1.65* Gravel, 1½ inch and less .60	1.25@1.3 1.2 1.4 Gravel, 2 inch and less
maha, Neb. ueblo, Colo. coche Spur, Tulare Co., Cal Louis, Mo an Francisco, Cal eattle, Wash. ancouver, B. C. (Scows) Ba City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn	1.20@1.35 1.25* Ink Rur Fine Sand 1/10 inch down .50 .45@ .60	.60 .75 1.20@1.25 1.45* 1 Sand 5 Sand, 5 inch and less .40@.60	35 River sai 1.50@1.75 15 for all gr. 2.00* 1.70* and Gr Gravel, ½ inch and less .60	nd ¼ inch 1.30@1.40 ades gravel. 1.25* 1.65* avel Gravel, 1 inch and less .60	1.75 1.25@1.40 1.25* 1.65* Gravel, 1½ inch and less .60	1.25@1.3 1.2 1.4 Gravel, 2 inch and less .6
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal Louis, Mo an Francisco, Cal arttle, Wash. ancouver, B. C. (Scows) Ba City or shipping point EASTERN: titica, N. Y conville, N. Y owell Junction, Mass	1.20@1.35 1.25* Ink Rur Fine Sand 1/10 inch down down 45@.60 All sand, .8	.60 .75 1.20@1.25* 1.45* 1 Sand, ¼ inch and less .50. .40@.60 .50*@.75*	35 River sai 1.50@1.75 15 for all gr. 2.00* 1.70* and Gr Gravel, ½ inch and less .60	nd ¼ inch 1.30@1.40 ades gravel. 1.25* 1.65* avel Gravel, 1 inch and less .60	1.75 1.25@1.40 1.25* 1.65* Gravel, 1½ inch and less .60	1.25@1.3 1.2 1.4 Gravel, 2 inch and less .6
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal Louis, Mo an Francisco, Cal arttle, Wash. ancouver, B. C. (Scows) Ba City or shipping point EASTERN: ttica, N. Y. oonville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass ttstord, N. Y.	1.20@1.35 1.25* Ink Rur Fine Sand 1/10 inch down .50 .45@.60 All sand, .8	.60 .75 1.20@1.25 1.45* 1.45* 1 Sand , Sand, ¼ inch and less .50 .40@.60 .50*@.75* .50*@.75*	35 River sai 1.50@1.75 15 for all gri 2.00° 1.70° and Gr Gravel, ½ inch and less .60	1.30@1.40 1.30@1.40 1.30@1.40 1.25* 1.65* avel Gravel, 1 inch and less .60	1.75 1.25@1.40 1.25* 1.65* Gravel, 1½ inch and less	1.25@1.3 1.2 1.4 Gravel. 2 inch and less .6
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal Louis, Mo an Francisco, Cal eattle, Wash. ancouver, B. C. (Scows) Ba City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass ttsford, N. Y. ardville, N. J.	1.20@1.35 1.25* Ink Rur Fine Sand 1/10 inch down down .50 .45@.60 All sand, .8	.60 .75 1.20@1.25* 1.45* 1 Sand, ¼ inch and less and less .50 .60 cu. yd. .50*@ .75* .50@ .75	35 River sai 1.50@1.75 15 for all gr: 2.00* 1.70* and Gr Gravel, ½ inch and less	nd ¼ inch 1.30@1.40 ades gravel. 1.25° 1.65° avel Gravel, 1 inch and less	1.75 1.25@1.40 1.25* 1.65* Gravel, 1½ inch and less	1.25@1.3 1.2 1.4 Gravel. 2 inch and less .6 .6
maha, Neb. ueblo, Colo. oche Spur, Tulare Co., Cal Louis, Mo an Francisco, Cal arttle, Wash. ancouver, B. C. (Scows) Ba City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass. ittsford, N. Y. ardville, N. J. ork, Pa	.60 .80 1.20@1.35 1.25* nk Rur Fine Sand 1/10 inch down .50 .45@ .60 All sand, .8	.60 .75 1.20@1.25* 1.45* 1 Sand, ½ inch and less .40@.60 80 cu. yd. .50*@.75* .50.76*	35 River sai 1.50@1.75 15 for all gr 2.00° 1.70° and Gr Gravel, ½ inch and less 60 (crusher	and 1/4 inch 1.30@1.40 1.30@1.40 1.25° 1.65* avel Gravel, 1 inch and less .60	1.75 1.25@1.40 1.25* 1.65* Gravel, 1½ inch and less .60	1.25@1.3 1.2 1.4 Gravel. 2 inch and less .6
City or shipping point EASTERN: titica, N. Y. oonville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass ittsford, N. Y. ardville, N. J. ork, Pa.	Fine Sand 1/10 inch down .50 .45@ .60 All sand, .8	, Sand, ¼ inch and less .50 .60 .60 cu. yd50*@ .75* .50 .50 .75 .90@1.10	35 River sai 1.50@1.75 15 for all gr 2.00* and Gr Gravel, ½ inch and less .60	ad ¼ inch 1.30@1.40 ades gravel. 1.25° 1.65° avel Gravel, 1 inch and less .60	1.75 1.25@1.40 1.25* 1.65* Gravel, 1½ inch and less .60	1.25@1.3 1.2 1.4 Gravel. 2 inch and less .6 .6
City or shipping point EASTERN: titica, N. Y conville, N. Y urnside, Sand Pit, Conn owell Junction, Mass ttsford, N. Y ardville, N. J crk, Pa	Fine Sand 1/10 inch down .50 .45@ .60 All sand, .8	, Sand, ¼ inch and less .50 .60 .60 cu. yd50*@ .75* .50 .50 .75 .90@1.10	Gravel, ½ inch and less .60	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60	Gravel. 2 inch and less .6 .6
City or shipping point EASTERN: titica, N. Y conville, N. Y urnside, Sand Pit, Conn owell Junction, Mass ttsford, N. Y ardville, N. J crk, Pa	Fine Sand 1/10 inch down .50 .45@ .60 All sand, .8	, Sand, ¼ inch and less .50 .60 .60 cu. yd50*@ .75* .50 .50 .75 .90@1.10	Gravel, ½ inch and less .60	Gravel, 1 inch and less .60	1.75 1.25@1.40 1.25* 1.65* Gravel, 1½ inch and less .60	Gravel. 2 inch and less .6 .6
City or shipping point EASTERN: titica, N. Y. oonville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass ittsford, N. Y. ardville, N. J. ork, Pa.	Fine Sand 1/10 inch down .50 .45@ .60 All sand, .8	, Sand, ¼ inch and less .50 .60 .60 cu. yd50*@ .75* .50 .50 .75 .90@1.10	Gravel, ½ inch and less .60 (crushed 1.00@1.75 b 50% gr	Gravel, 1 inch and less .60 d rock) ank sand .80	Gravel, 1½ inch and less .60	Gravel. 2 inch and less .6 .6
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass. ittsford, N. Y. ardville, N. J. crk. Pa. CENTRAL: leveland, Ohio ovington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich.	Fine Sand 1/10 inch down .50 .45@ .60 All sand, .8	, Sand, ¼ inch and less .50 .40@ .60 .80 cu. yd50 .50 .75 .50 .75 .90@1.10	Gravel, ½ inch and less .60	Gravel, 1 inch and less .60 drock) ank sand .80	Gravel, 1½ inch and less .60	Gravel. 2 inch and less .6 .6
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass. ittsford, N. Y. ardville, N. J. crk. Pa. CENTRAL: leveland, Ohio ovington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich.	Fine Sand 1/10 inch down .50 .45@ .60 All sand, .8	, Sand, ¼ inch and less .50 .40@ .60 .80 cu. yd50 .50 .75 .50 .75 .90@1.10	Gravel, ½ inch and less .60 (crushed 1.00@1.75 b 50% gr	Gravel, 1 inch and less .60 drock) ank sand .80 ll sizes mix .55	Gravel, 1½ inch and less .60	Gravel. 2 inch and less .6 .6
City or shipping point EASTERN: titica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass ittsford, N. Y. ardville, N. J. ork, Pa. CENTRAL: leveland, Ohio ovington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich. dianapolis, Ind.	Fine Sand 1/10 inch down .50 .45@ .60 All sand, .8	, Sand, ¼ inch and less .50 .40@ .60 .80 .75° .50 .75° .50 .90@ 1.10	Gravel, ½ inch and less .60 (crushed 1.00@1.75 b 50% gr	Gravel, 1 inch and less	Gravel, 1½ inch and less .60 .60 .50@ .75	Gravel. 2 inch and less .6 .6
City or shipping point EASTERN: titica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass ittsford, N. Y. ardville, N. J. ork, Pa. CENTRAL: leveland, Ohio ovington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich. dianapolis, Ind.	Fine Sand 1/10 inch down .50 .45@ .60 All sand, .8	, Sand, ¼ inch and less .50 ,40@ .60 80 cu. yd50 .50 .75 .50 .75 .90 @ 1.10	Gravel, ½ inch and less .60 (crushed 1.00@1.75 b .85 for al Concrete :	Gravel, 1 inch and less	Gravel, 1½ inch and less .60 .60 .75 .50@ .75	Gravel. 2 inch and less .661.2
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. cowell Junction, Mass. ittsford, N. Y. ardville, N. J. crk. Pa. CENTRAL: leveland, Ohio ovington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich. dianapolis, Ind. mesville, Wis. iliford, Ind. coline, Ill. cortement Ohio	Fine Sand 1/10 inch down .50 .45 @ .60 All sand, .8	, Sand, ¼ inch and less .50 .40@ .60 .50 .50 .75 .50@ .75 .50@ .75 .90@1.10	Gravel, ½ inch and less	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 y	Gravel. 2 inch and less .6 1.2
City or shipping point EASTERN: ttica, N. Y. conville, N. J. c	Fine Sand 1/10 inch down .50 .45 @ .60 All sand, .8	, Sand, ¼ inch and less .50 .40@ .60 .50 .50 .75 .50@ .75 .50@ .75 .90@1.10	Gravel, ½ inch and less	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 y	Gravel. 2 inch and less6.6.1.2
City or shipping point EASTERN: ttica, N. Y. conville, N. J. c	Fine Sand 1/10 inch down .50 .45 @ .60 All sand, .8	, Sand, ¼ inch and less .50 .40@ .60 .50 .50 .75 .50@ .75 .50@ .75 .90@1.10	Gravel, ½ inch and less	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 y	Gravel. 2 inch and less .6 1.2
City or shipping point EASTERN: ttica, N. Y. conville, N. J. c	Fine Sand 1/10 inch down .50 .45 @ .60 All sand, .8	, Sand, ¼ inch and less .50 .40@ .60 .50 .50 .75 .50@ .75 .50@ .75 .90@1.10	Gravel, ½ inch and less	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 9	Gravel. 2 inch and less 6.6.6.6.1.2
City or shipping point EASTERN: ttica, N. Y. conville, N. J. c	Fine Sand 1/10 inch down .50 .45 @ .60 All sand, .8	, Sand, ¼ inch and less .50 .40@ .60 .50 .50 .75 .50@ .75 .50@ .75 .90@1.10	Gravel, ½ inch and less	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 9	Gravel, 2 inch and less 6.6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass. ittsford, N. Y. ardville, N. J. crk. Pa. CENTRAL: leveland, Ohio owington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich. didianapolis, Ind. mesville, Wis. iliford, Ind. oline, Ill. ortsmouth, Ohio abula, Ia. aginaw, Mich.—(River dock). erre Haute, Montezuma, Ind. oledo, Ohio 'Abash Valley District, Ind.	Fine Sand 1/10 inch down .50 .45 @ .60 All sand, .8	, Sand, ¼ inch and less .50 .60 .60 .60 .60 .50 .50 .75 .50 .75 .90 .71 .10 .60;	Gravel, ½ inch and less .60	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 .50 .60	Gravel, 2 inch and less 6.6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6
City or shipping point EASTERN: ttica, N. Y. conville, N. J. conville,	Fine Sand 1/10 inch down .50 .45 @ .60 All sand, .8	, Sand, ¼ inch and less .50 .60 .60 .60 .60 .50 .50 .75 .50 .75 .90 .71 .10 .60;	Gravel, ½ inch and less .60	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 .50 .60	Gravel. 2 inch and less 6.6.6.6.1.2
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass. ittsford, N. Y. ardville, N. J. crk. Pa. CENTRAL: leveland, Ohio owington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich. dianapolis, Ind. mesville. Wis. iliford, Ind. oline, Ill. ortsmouth, Ohio abula, Ia. aginaw, Mich.—(River dock). erre Haute, Montezuma, Ind. oledo, Ohio 'abash Valley District, Ind. 'inona, Minn.	Fine Sand 1/10 inch down .50 .45 @ .60 .45 @ .60 .45 @ .60 .60	, Sand, ¼ inch and less .50 .60 .60 .60 .60 .50 .75 .50 .75 .90 .71 .10 .65 .65 .65 .65 .65 .65 .65 .65 .65 .65	Gravel, 3/2 inch and less .60	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 .50 .60	Gravel, 2 inch and less
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass. ittsford, N. Y. ardville, N. J. crk. Pa. CENTRAL: leveland, Ohio owington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich. dianapolis, Ind. mesville. Wis. iliford, Ind. oline, Ill. ortsmouth, Ohio abula, Ia. aginaw, Mich.—(River dock). erre Haute, Montezuma, Ind. oledo, Ohio 'abash Valley District, Ind. 'inona, Minn.	Fine Sand 1/10 inch down .50 .45 @ .60 .45 @ .60 .45 @ .60 .60	, Sand, ¼ inch and less .50 .60 .60 .60 .60 .50 .75 .50 .75 .90 .71 .10 .65 .65 .65 .65 .65 .65 .65 .65 .65 .65	Gravel, 3/2 inch and less .60	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 .50 .60	Gravel, 2 inch and less
City or shipping point EASTERN: ttica, N. Y. conville, N. J.	Fine Sand 1/10 inch down .50 .45 @ .60 .45 @ .60 .45 @ .60 .60	, Sand, ¼ inch and less .50 .60 .60 .60 .60 .50 .75 .50 .75 .90 .71 .10 .65 .65 .65 .65 .65 .65 .65 .65 .65 .65	Gravel, 3/2 inch and less .60	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .75 .50 .75 .50 .75 .50 .75 .50 .60 .60 .60 .60	Gravel, 2 inch and less 6.6.6.6.6.1.2.
City or shipping point EASTERN: ttica, N. Y. conville, N. J.	Fine Sand 1/10 inch down .50 .45 @ .60 .45 @ .60 .45 @ .60 .60	, Sand, ¼ inch and less .50 .40 @ .60 .60 cu. yd50 @ .75 .50 @ .75 .90 @1.10 .65 .65 .65 .65 .65 .65 .65 .65 .65	Gravel, 3/2 inch and less .60	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .75 .50 .75 .50 .75 .50 .75 .50 .60 .60 .60 .60	Gravel, 2 inch and less 6.6.6.6.6.1.2.
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass. ittsford, N. Y. ardville, N. J. crk. Pa. CENTRAL: leveland, Ohio owington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich. dianapolis, Ind. mesville. Wis. iliford, Ind. oline, Ill. ortsmouth, Ohio abula, Ia. aginaw, Mich.—(River dock). erre Haute, Montezuma, Ind. oledo, Ohio 'abash Valley District, Ind. 'inona, Minn.	Fine Sand 1/10 inch down .50 .45 @ .60 .45 @ .60 .45 @ .60 .60	, Sand, ¼ inch and less .50 .40 @ .60 .60 cu. yd50 @ .75 .50 @ .75 .90 @1.10 .65 .65 .65 .65 .65 .65 .65 .65 .65	Gravel, 3/2 inch and less .60	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .75 .50 .75 .50 .75 .50 .75 .50 .60 .60 .60 .60	Gravel, 2 inch and less 6.6.6.6.6.1.2.
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass. ittsford, N. Y. ardville, N. J. crk. Pa. CENTRAL: leveland, Ohio owington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich. dianapolis, Ind. mesville. Wis. iliford, Ind. oline, Ill. ortsmouth, Ohio abula, Ia. aginaw, Mich.—(River dock). erre Haute, Montezuma, Ind. oledo, Ohio 'abash Valley District, Ind. 'inona, Minn.	Fine Sand 1/10 inch down .50 .45 @ .60 .45 @ .60 .60 .60 .60 .65 @ .90 .65 @ .90	, Sand, 1/4 inch and less .50 .40 .60 .60 .60 .50 .75 .50 .75 .90 .71 .10 .65 .65 .65 .65 .65 .65 .65 .65 .65 .65	Gravel, ½ inch and less .60	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 .50 .60	Gravel, 2 inch and less
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass ttsford, N. Y. ardville, N. J. crk, Pa. CENTRAL: leveland, Ohio ovington, Ind. ces Moines, Ia.—Concrete mix. scanaba, Mich. didianapolis, Ind. mesville, Wis. ilford, Ind. oline, Ill. ortsmouth, Ohio ababla, Ia. ginaw, Mich.—(River dock). crre Haute, Montezuma, Ind. oledo, Ohio 'abash Valley District, Ind. 'inona, Minn. SOUTHERN: owcott, La. (50% and up in plin, Mo. noxville, Tenn. mdsay, Tex. emphis, Tenn.	Fine Sand 1/10 inch down .50 .45 @ .60 .45 @ .60 .60 .60 .60 .65 @ .90 .65 @ .90	, Sand, 1/4 inch and less .50 .40 .60 .60 .60 .50 .75 .50 .75 .90 .71 .10 .65 .65 .65 .65 .65 .65 .65 .65 .65 .65	Gravel, ½ inch and less .60	Gravel, 1 inch and less .60	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 .50 .60	Gravel, 2 inch and less
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. conville, N. Y. conville, N. Y. ardville, N. J. cork, Pa. CENTRAL: leveland, Ohio covington, Ind. cs Moines, Ia.—Concrete mix. scanaba, Mich. dianapolis, Ind. coline, Ill. coline, Ill. cortsmouth, Ohio conville, Wis. colinford, Ind. coline, Ill. cortsmouth, Ohio coline, Ill. c	Fine Sand 1/10 inch down down .50 .45 .60 .41 sand, .8 .50 .60 .60 .60 .75 .85 @ .90 .65 @ .90	, Sand, 34 inch and less .50 .60 .50 .75 .50 .75 .90 .71 .10 .60 .60 .60 .60 .60 .60 .75 .90 .90 .75 .90 .90 .90 .90 .90 .90 .90 .90 .90 .90	Gravel, 3/2 inch and less .60	Gravel, 1 inch and less .60 d rock) ank sand .80 Il sizes mix, .55 .20 .44 for concrete ½" screen,	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 .50 .60	Gravel, 2 inch and less
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. conville, N. Y. conville, N. Y. ardville, N. J. cork, Pa. CENTRAL: leveland, Ohio covington, Ind. ces Moines, Ia.—Concrete mix. scanaba, Mich.—dianapolis, Ind. coline, Ill. coline, Ill. cortsmouth, Ohio abula, Ia. cerre Haute, Montezuma, Ind. colled, Ohio cortsmouth, Ohio abula, Ia. cerre Haute, Montezuma, Ind. colledo, Ohio cortsmouth, Ohio abula, Ia. cortsm	Fine Sand 1/10 inch down down .50 .45 .60 .41 sand, .8 .50 .60 .60 .60 .75 .85 @ .90 .65 @ .90	, Sand, 34 inch and less .50 .60 .50 .75 .50 .75 .90 .71 .10 .60 .60 .60 .60 .60 .60 .75 .90 .90 .75 .90 .90 .90 .90 .90 .90 .90 .90 .90 .90	Gravel, 3/2 inch and less .60	Gravel, 1 inch and less .60 d rock) ank sand .80 Il sizes mix, .55 .20 .44 for concrete ½" screen,	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 .50 .60 .60 .60 .60 .60 .60 .60 .60 .60 .6	Gravel. 2 inch and less 6.6.6.6.1.2
City or shipping point EASTERN: ttica, N. Y. oonville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass ittsford, N. Y. ardville, N. J. ork, Pa. CENTRAL: leveland, Ohio ovington, Ind. es Moines, Ia.—Concrete mix. scanaba, Mich. dianapolis, Ind. unesville, Wis. (ilford, Ind. oline, Ill. oortsmouth, Ohio abula, Ia. aginaw, Mich.—(River dock). erre Haute, Montezuma, Ind. oledo, Ohio 'abash Valley District, Ind 'inona, Minn. SOUTHEEN: owcott, La. (50% and up in polin, Mo. noxville, Tenn. indsay, Tex. emphis, Tenn. alde Rouge, La.	Fine Sand 1/10 inch down down .50 .45 .60 .41 sand, .8 .50 .60 .60 .60 .75 .85 @ .90 .65 @ .90	, Sand, 34 inch and less .50 .60 .50 .75 .50 .75 .90 .71 .10 .60 .60 .60 .60 .60 .60 .75 .90 .90 .75 .90 .90 .90 .90 .90 .90 .90 .90 .90 .90	Gravel, 3/2 inch and less .60	Gravel, 1 inch and less .60 d rock) ank sand .80 Il sizes mix, .55 .20 .44 for concrete ½" screen,	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 y .60 .85@1.10 , .85@1.10 .60 per tom	Gravel. 2 inch and less 6.6.6.6.6.1.2
City or shipping point EASTERN: ttica, N. Y. conville, N. Y. urnside, Sand Pit, Conn. owell Junction, Mass ittsford, N. Y. ardville, N. J. ork, Pa. CENTRAL: leveland, Ohio ovington, Ind. les Moines, Ia.—Concrete mix. scanaba, Mich. dianapolis, Ind. lifford, Ind. loline, Ill. ortsmouth, Ohio abula, Ia. aginaw, Mich.—(River dock). erre Haute, Montezuma, Ind. loledo, Ohio //abash Valley District, Ind. //inona, Minn. SOUTHERN: owcott, La. (50% and up in pplin, Mo. noxville, Tenn. indsay, Tex. emphis, Tenn.	Fine Sand 1/10 inch down down .50 .45 .60 .41 sand, .8 .50 .60 .60 .60 .75 .85 @ .90 .65 @ .90	, Sand, 34 inch and less .50 .60 .50 .75 .50 .75 .90 .71 .10 .60 .60 .60 .60 .60 .60 .75 .90 .90 .75 .90 .90 .90 .90 .90 .90 .90 .90 .90 .90	Gravel, 3/2 inch and less .60	Gravel, 1 inch and less .60 d rock) ank sand .80 Il sizes mix, .55 .20 .44 for concrete ½" screen,	Gravel, 1½ inch and less .60 .60 .50@ .75 .50 1.75 y .60 .85@1.10 , .85@1.10 .60 per tom	Gravel. 2 inch and less 6.6.6.6.6.1.2

Railways Should Help in Exploiting Agricultural Limestone

KENTUCKY CRUSHER MAN who in bygone years has sold a nominal price and even given away carload after carload of fine limestone to farmers in order to get them started to using it, and who has built up a good paying trade in this product for which he can now get profitable prices, finds the way of exploitation much easier now, and some cooperation coming into the

County agents almost everywhere, and the agricultural departments, are doing their bit in the good work, and that helps a lot of course. Another line of cooperative effort spoken of by him that is worthy of some special thought and action is that of the railroads which may gain in tonnage by the upbuilding of this trade.

He said that the commercial agent of a railroad at his point had gotten up a booklet of interesting information and data about agricultural limestone that he considered splendid propaganda, so they had sort of teamed up together in the work and both he and the railroad were sending out similar matter.

Live-wire railway managers, seeing tonnage possibilities in a wider use of agricultural lime make a fruitful field of possibilities for the development of cooperative effort in the exploitation of ground limestone for agricultural use. If you have not already gotten in touch with your railway agents upon this subject have a try at it.

Activity in Gravel Fields of Tennessee

MEMPHIS, TENN.—Sharp activity in the gravel and sand fields is observable here. Much road repair work, and bidding on several large pieces of road work is being made. Plans for some large building structures are under consideration. Development of river terminals and plans for the city auditorium and market which it is said will be completed ready for work to start in May, are matters of interest.

The Greenville Stone and Gravel Co. one of the large gravel pit and shipping firms of Memphis has largely increased its capital stock the last few weeks. The Batesville Stone and Gravel Co., Elliott Lang, manager, are preparing for a large amount of railroad and road construction work.

The Missouri Portland Cement Co., Memphis, operating along the river report a good activity in sand at their several yards and gravel business also.

There is talk of a new banking build-

ing for the Federal Reserve Branch of the St. Louis Bank here. The Stratton-Warren Hardware Co. will erect a large new warehouse building early in 1919.

Sixty miles of gravel road in Cohoama County, Miss., will be the subject of bids until Feb. 3, 1919, at Clarksdale, Miss. L. W. Mashburn, engineer and T. S. Alderholt, president of the Board of Supervisors.

The approach of February finds trade prospects bright in the Memphis section. Gravel and sand dealers are getting many inquiries relative to work. Labor conditions are still sharp.

The Allen Gravel Co., Memphis, is operating gravel pits and is finding good spring outlook.

The Wolf River Sand Co. and other sand companies in Memphis report much work in prospect for March and April and some contracts being made now.

Mr. Fraser, of A. J. Cook and Co., builders' supplies, says that spring business outlook in Memphis territory was

Pacific Coast Road Plans

SAN FRANCISCO, Cal.—The outlook for the sale of rock and building material on the West Coast for the year 1919 is decidedly promising. It is understood that \$15,000,000 will be spent in road improvement during the coming

In the State of Oregon, with more than \$6,000,000 aviliable for the year 1919 for highway work, the State Highway Commission has called upon the various counties for their grading budgets, and as soon as they are received the commission will hold a meeting and formulate a hard-surfacing program. Under the law the counties must do the grading, and it will be the general policy of the Commission during the coming year to hard surface as many of the projects as the counties are prepared to grade.

The Union Construction Company's shipbuilding plant on the western waterfront of the City of Oakland, California, is rapidly nearing completion.

Marl Lands Jump in Price

SHREWSBURY, N. J.—Owners of farms along the shore having marl under the soil are being offered big acreage prices for their land, it is said, by companies organized to mine marl for the potash it contains.

Some of the farms are bringing hundreds of dollars an acre. The Charles McCue farm, near here, of 40 acres, sold for \$21,000.

Government Loans to Home Builders

WASHINGTON.—Aid to home builders on a national scale, similar to that given farmers by the federal farm loan banks, has been suggested by E. L. Keesler of Charlotte, N. C., president of the United States League of Building and Loan Associations, to the department of labor, as a step in stimulating private construction during the period of industrial transition from a war to a peace basis.

Mr. Keesler urged that mortgages made over to building and loan associations should be rediscountable at federal reserve banks or that farm loan banks be authorized to accept mortgages on homes as well as on farms.

Building and loan associations number 7269 with a total membership of 3,838,-612, and assets of \$1,750,000,000.

Government loans to home builders is an established fact in Canada, as noted in Rock Products of January 15, page 65.

Importations of Gypsum

WASHINGTON, D. C.—Figures compiled by the Department of Commerce show that during the month of November, importations of gypsum amounted to 4,289 tons, valued at \$10,-815, as compared with 13,842 tons, worth \$19,671, during the corresponding month of 1917. This brings the total importations for the first eleven months of 1918 to 46,627 tons, valued at \$118,524, against 220,883 tons, worth \$358,683 during the corresponding period of 1917, and 214,-018 tons, with a value of \$316,697, in

Invite Bids for Supplying Cement

WASHINGTON, D. C.—The Department of the Interior has announced that sealed proposals will be opened February 10 at the office of the United States Reclamation Service, Tramway Building, Denver, Colo., for furnishing 50,000 barrels of Portland cement, f. o. b. cars at the works of the bidder. Full information and proposal blanks can be secured from the reclamation service office in Denver or from the Department, in Washington.

Washington Farmers Paying \$7.20 per Ton for Lime

VANCOUVER, Wash.—The Farmers in Clarke County have bought three carloads of lime at \$5 per ton. The freight from Tacoma to Yacolt, is \$2.20 a ton, making a total cost of \$7.20 per ton.

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Incorporations

Marion Fluor Spar & Lead Co., Marion, Ky., capital \$25,000, incorporated by C. W. Haynes, W. V. Haynes and E. L. Harpending.

Massaponax Sand & Gravel Corp., Richmond, Va., capital \$100,000, chartered; Charles L. Ruf-fin, President; George M. Davis, Secretary.

Southern Lime and Stone Co., \$100,000; William Hukel, W. H. Swashue, Johnstown, Pa.; J. R. Rockel, Altoona, Pa.

East Sparta Clay and Lime Co., East Sparta, O., \$18,000; S. S. Fry, F. A. Esterly, D. A. Cable, Charles M. Ball and Peter J. Streb.

Washington Silica Sand Co., Brink Haven, O., \$30,000; W. P. Clark, Harry F. Moore, Paul W. Ashbaugh, C. E. Slate and Leroy G. Mayer.

Lancaster Coal and Sand Co., Lancaster, O., \$100,000; O. L. Ballinger, D. L. Hansberger, W. S. Sims, Robert Rutter and Joseph H. Goldcamp.

The Western Lime Products Co., Ltd., capital \$25,000. W. L. Mason and Hoyt Post, Jr., Los Angeles, and J. G. Hately, Covina, Cal., head the company.

Cleveland Crushed Limestone Co., Cleveland, O., \$10,000; incorporators, H. A. Rocker, J. Goldman, Thomas E. Greeene, Oscar J. Cramer, Fred E. Wertshafter.

Manteno Phosphate and Limestone Co., Man-teno, Ill., capital \$2,500; incorporators, Luther W. Smith, J. L. Schmeltzer and W. H. Kimmel-

International Cement Corporation, Wilmington, Del.; manufacture of cement, lime, limestone building blocks and concrete of all kinds; capital, \$43,200,000.

The Marcem Quarries Corp., Bristol, Va., has been organized with a capital of \$300,000. W. M. Bennett and W. M. Bennett, Jr., both of Kingsport, Tenn., have been elected president and secretary, respectively.

United States Gypsum Co., a New Jersey corporation, qualified to do business in Indiana; \$121,000 of its capital stock is represented in Indiana; to manufacture, buy and sell gypsum; A. L. Bangham, Indianapolis, is named as agent.

Independent Sand & Gravel Co., Des Moines, Ia.; capital, \$100,000. President, F. H. Larson, Lake Mills, Ia.; vice president, T. J. Ouvenson, Fertile, Ia.; secretary, A. H. Bjorgo; treasurer, F. M. Lang, Mason City, Ia.

Springfield Quarry Co., Inc., Springfield, Vt.; capital stock, \$10,000. Stone quarrying and manufacturing. Incorporators are: W. E. Dix, Everard Stubus, Howard C. Miller, Julien S. Jacobs, Springfield, Vt.

Torrance Lime and Fertilizer Co., Torrance, Cal.; capital, \$200,000. Directors: George W. Towne, George W. Neill, Frank Sammons, Verne E. Johnston and Warren W. Johnston, Torrance, Cal. Articles filed by J. Kesgh, 301 Bradbury Bldg., L. A.

Personals

T. B. Fogg, recently receiver of the Toledo Stone & Glass Sand Co., is now with the Garford Motor Truck Co., Lima, Ohio.

W. H. K. Bennett has been recently appointed manager in charge of the pump department of the American Manganese Co., Chicago. Mr. Bennett has been connected with the company for a number of years, and has had a wide experience in pump installations.

Theodore Dammann of Milwaukee, Wis., retiring county treasurer, announces that he will hereafter serve as secretary-treasurer and financial manager of the American Granite Co., 15th and Cleveland avenues. The company's quarries are at Granite Heights, Marathon county.

Potash

Omaha Potash & Refining Co., of Lakeside, Neb., lans to build a plant 20 miles south of Lakeside. will cost about \$500,000.

Quarries

Fire on January 15 destroyed the sale mill, administration building and an auxiliary structure at the plant of the Bangor Slate Co., Bangor, Pa. The total loss is placed at \$12,000.

Fire on January 17 damaged the plant of the Philadelphia Quartz Co., located near Rahway, in Woodbridge Township, with loss estimated at about \$2,000.

Woodbridge about \$2,000.

The Texas Trap Rock Co., San Antonio, Tex., has increased its capital from \$80,000 to \$100,000. It is understood that the company will increase the present capacity.

The crushing plant of the E. J. Lavion Co., Plymouth, Pa., located near Trenton Cut-off tracks, is being torn down and the machinery removed to Howeville, where the company has purchased a quarry and equipment.

The Little Falls Stone Crushing plant, just east of Little Falls, N. Y., on the south side of the Mohawk River, has been sold to the New York Trap Rock Corporation. The plant was operated a number of years ago by a company headed by Henry Shaper. Henry Shaper.

Henry Shaper.

The Waller Stone Co., of McDermott, O., has disposed of its stone interests at Bowling Green, Ky., it was announced by Chales C. Waller, who has been there for the past few years managing the business. The company opened and developed the quarries at Bowling Green several years ago and from the start the company prospered. It is one of the most valuable quarries in the country, as well as being one of the best equipped.

as well as being one of the best equipped.

The Hamilton, O., Journal says that a real estate deal is consummating in that city, by which it is said the Long & Alstatter Co. will purchase the property of the Buckeye Marble Co., in West Hamilton. To this plant will be moved the present manufacturing machinery of the company, for the making of farm implements. It is said that the deal involves approximately \$75,000. The plant of the Buckeye Marble Company consists of several large buildings and three acres of ground.

Cement

The Security Cement & Lime Co., Hagerstown, d., is planning a new brick addition to its plant.

The Lehigh Portland Cement Co., Allentown, Pa., have elected the following directors: General H. C. Trexler, Col. E. M. Young, Allentown; John D. Ormrod, Emaus; George K. Mosser, Trexlertown; and Albert T. Gowan, Chicago.

The plant of the Acme Cement Corp., Catskill, N. Y., located about five miles from the city, and having frontages on the West Shore Railroad and the Hudson River, has been offered for sale. The property comprises over 700 acres of rand, containing deposits of rock and clay of very fine quality, with manufacturing buildings of modern concrete and steel construction, and machinery and equipment.

Gypsum Products

The Centerville (Ia.) gypsum mill is ready for operation. A few carloads of product have already been turned out and put on the market. This was made up from gypsum mined before the mill was built. Now the shaft is being cleared of water and better pumping facilities being installed so as to begin mining in earnest.

Sand and Gravel

Rockton Molding Sand Co., Rockton, Ill., has

dissolved.

The newly elected officers of the Monmouth (N. J.) Gravel Co. are Henry S. Terhune, president: William R. Joline, vice president; Wilbur A. Heisley, treasurer, and Benjamin Morris, secretary. The company is a Long Branch concern. W. J. Bathrich and H. N. Dyke, Imperial, Cal., are planning to install a gravel crusher and screen at their properties near Frink Siding, located in the vicinity of Niland, the work to cost \$15,000. It is also proposed to construct a tramway system about 6,000 feet in length to connect with the railroad.

Manufacturers

Aetna Explosive Co., New York, are offering for sale through the receivers, George C. Holt and Benjamin B. Odell, military explosives plants near six different cities. The offerings in each case include the land, buildings and equipment. The plants are located near Aetna, Ind., and near the following places in Pennsylvania: Carnegie, Oakdale, Noblestown, Emporium and Mount

Link-Belt Co.'s Book No. 333 will be of interest to producers of mineral aggregates even though the book limits itself to a discussion of "Equipment for the Handling and Preparation of Coal at the Mine," which is the title. Here are photographs, drawings and text describing the practical uses of tipples, conveyors, screening plants, locomotive cranes, loading booms, mine car dumps, chutes, washeries, and other devices.

aumps, cnutes, washeries, and other devices.

American Manganese Steel Co., Chicago, Ill., have issued an illustrated pamphlet descriptive of the Amsco centrifugal sand and gravel pump. It merits are told in detail with text, drawings and photographs, and the particular quality of resistance to sand abrasion is emphasized. To the manganese steel used in the construction of the pump is due the wear resisting character of the pump. Aside from the hard steel, there are enumerated other points of advantage in the manner of the construction of the pump itself, as to capacity, speed and economy of operation.

The Thew Automatic Shovel Co. (Lorain O.)

The Thew Automatic Shovel Co. (Lorain, O.)

The Thew Automatic Shovel Co. (Lorain, O.) sales force, at its annual meeting—the most enthusiastic in its history—agreed that the prospect for immediate business is exceptionally promising, particularly for road and street construction on an enormous scale. The sentiment of the country, judged by the reports of these sales representatives, is strongly for the rapid completion of a universal system of dependable highways. Foreseeing this condition and realizing that road-building machinery of the future must have a much wider range of usefulness, a complete new line—the Type 00 Series—has been added to the Thew line of earth moving and handling equipment. This machine is equipped either as a full-circle swing shovel or crane, and is provided with either steam, gasoline or electric power. For regular shovel work, it carries a one-half yard dipper. Double-drum mechanism may be furnished for clam shell or crane operation. It weighs only 14 tons.

The White Co., Cleveland, O., have received

only 14 tons.

The White Co., Cleveland, O., have received copies of citations of an award of the much-coveted Croix de Guerre to the First and Second Groupements, each operating 500 or more White trucks in the service of the Great Headquarters Reserve No. 1, of France. Later, this entire Reserve, operating 2,500 Whites, was recognized by a similar citation. The Orders of the Day read "for the finest military spirit" and "the best qualities of endurance," in moving 200,000 troops to the front in a few days, many of them a distance of more than 100 miles. The task was tremendous, the crisis very grave. A supreme effort was necessary to stop the German advance last March on the British front. Without this unprecedented movement of French reserves right into the teeth of the fighting, the issue might have been serious indeed for the Allies. It was not uncommon for drivers to remain at their wheels 24 hours at a time. One groupement operated 200 hours out of 240. Another was on constant duty for 60 hours. Most of the White Trucks participating were war veterans, some of them having been in continuous field service since 1914. After four years of war, these units performed feats which enabled their organizations to win the Croix de Guerre. This is the first and only instance in French military history of a truck formation receiving this high honor.

Lime

In many sections of Chester county, Pa., a newspaper dispatch, arrangements are being made to place many of the ancient lime kilns in operation in order to produce sufficient lime to meet the demand. There are hundreds of the kilns about the county which are still in good condition, although not in use for many years.





ADVERTISEMENTS in this department are for the Sale and Want of Second-Hand Machinery and Equipment.

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Try us for honest value in dependable "used" material of this character. WE'LL TREAT YOU RIGHT.

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Dealers in "Used" but "Not Abused" Machinery

FOR SALE

One 20-ton standard eight wheel, Ohio Locomotive Crane complete with 50-foot boom and 11/4 yd. clam-shell bucket. This crane is in very good condition and ready for immediate shipment. Price, F. O. B. Bellefontaine, Ohio \$10,000.

AMERICAN REFRACTORIES CO., Union Arcade Bldg., Pittsburgh, Pa.

CRUSHERS 1—No. 21 Gates Gyratory 2—No. 12 Gates Gyratory 1—No. 10 Gates Gyratory 1—No. 10 Kennedy Gyratory 1—No. 9 Gates Gyratory 3—No. 8 Gates Gyratory 4—No. 7 1/2 Assorted Gyrator 6—No. 6 Assorted Gyratory 3—No. 5 Assorted Gyratory 8—No. 4, 3 & 2 Assorted J. F. DONAHOO CO.

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ASK US—WE HAVE IT

GRINDERS -60x84 Jaw Crusher -10x20 to 24x36 in. -Portable Jaw Plants -Coal Crushers -Tipples 4—Coal Consists
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BIRMINGHAM, ALA.

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one 18-inch Bonnot Pulverizer, strictly first class order, immediate shipment

John D. Owens & Son Co.

Owens, Ohio

FOR RENT OR SALE

Porter saddletank 36" gauge locomotives Western 36" gauge cars, 4 yard Locomotive 56 1/2" 12 x 14, Climax Western cars, 56 1/2", 6 yard Keystone steam shovel Drag line, caterpillar

Lock Box 205, Crown Point, Ind.

second-hand, on hand All sections of new and second-hand, on for quick shipment. Also purchase old abandoned plants for dismantling purposes.

M. K. FRANK, Pittsburgh, Pa.

FOR SALE

One practically new 10"x20" jaw crusher manufactured by Krom Machine Works, price complete with manganese steel dies \$800.00 F. O. B. cars Danville, Illinois. Immediate shipment can be made.

AMERICAN REFRACTORIES CO., 315 Union Arcade Bldg., · Pittsburgh, Pa.

FOR SALE

Used steam drill and six brand new End Dump Steel Quarry Cars, two yard capacity, equipped to handle from either end or side. Manufactured by Austin Manufacturing Co.

THE SHERMAN NURSERY COMPANY, Charles City, Iowa.

FOR SALE

One No. 8 Gates Gyratory Crusher, in first-class condition. Can be inspected at our Quarry, Fort Bellefontaine, Mo. Address

MISSOURI PORTLAND CEMENT CO., 1502 International Life Bldg., St. Louis, Mo.

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WANTED

Competent Superintendent to take charge of our quarry and crushing plant. Good salary and good position to man who can develop the production of the plant to its full capacity on an economical basis.

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WANTED

Man with technical knowledge and practical experience in crushing, conveying and excavating machinery, to take charge of group of Gravel Washing Plants in Illinois.

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To say you saw the ad in ROCK PRODUCTS gives tone to your inquiry.